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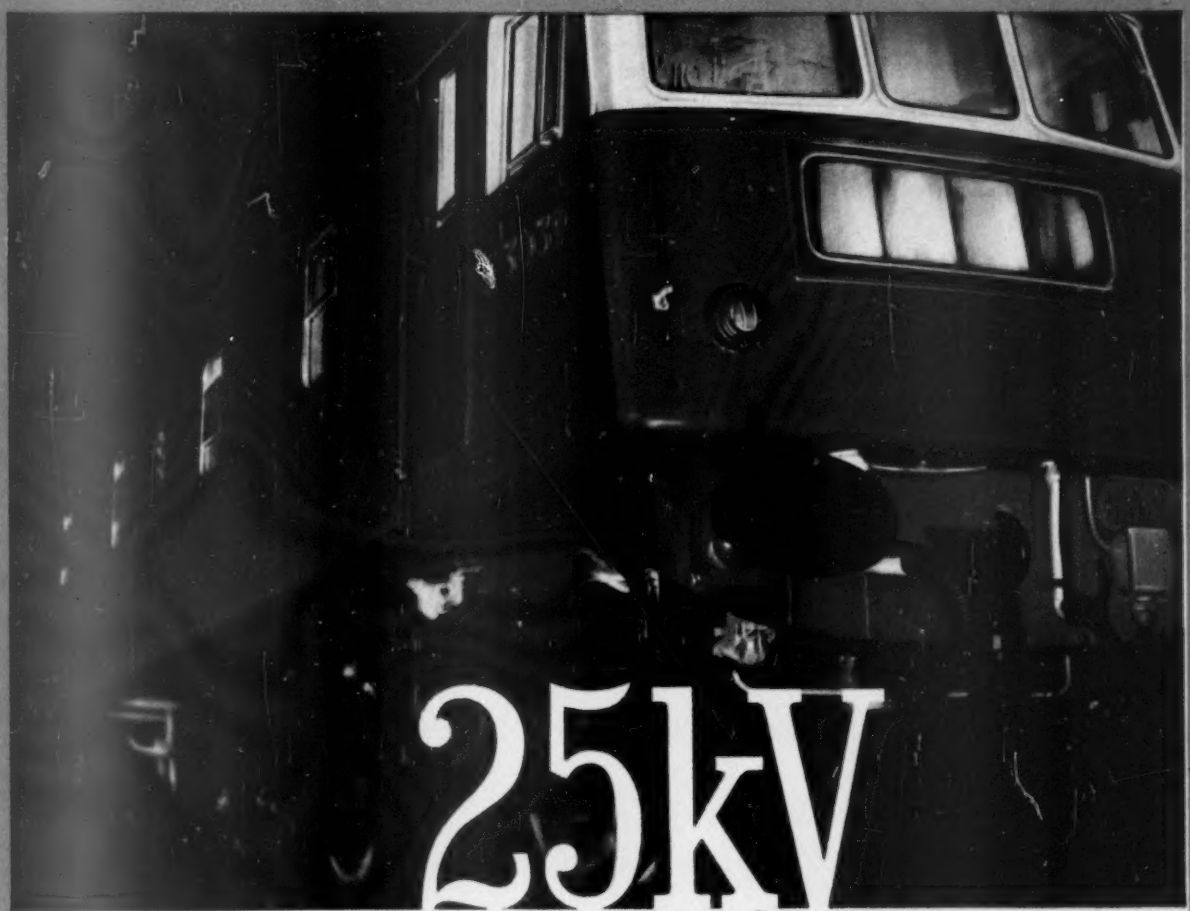

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On Sentinel Locomotives at a Steelworks

This illustration shows two of a fleet of Sentinel locomotives in use at the Middlesbrough works of Dorman Long & Co. Ltd.

The locomotive on the embankment is one of the 283 H.P. 0-6-0 locomotives fitted with Timken bearings on all axles.

Timken bearings are also fitted to 0-4-0 locomotives manufactured by Sentinel.

British Timken, Duston, Northampton, Division of The Timken Roller Bearing Company. Timken bearings manufactured in England, Australia, Brazil, Canada, France and U.S.A.

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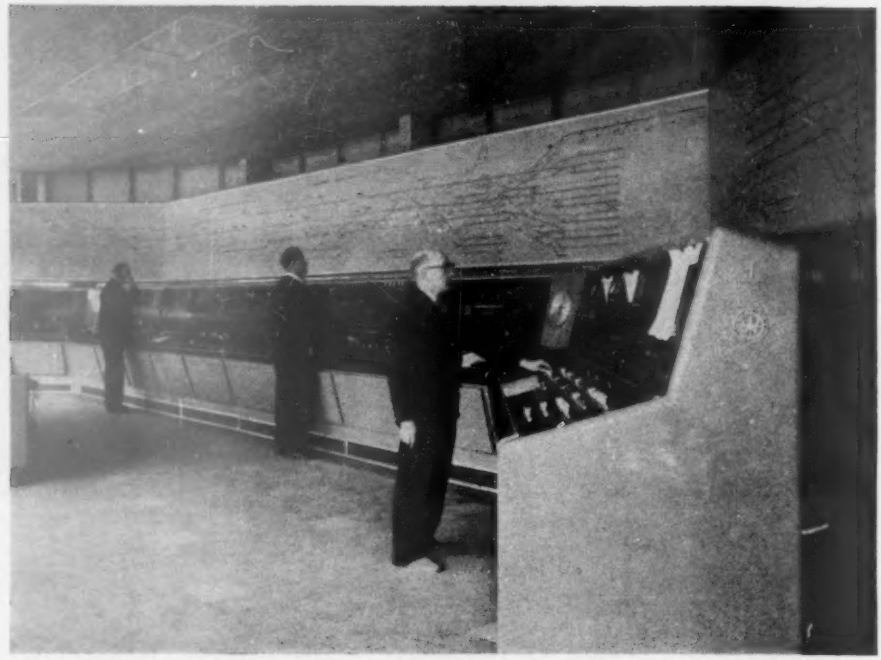

O.C.S. control desk and illuminated diagram at Manchester (London Road)

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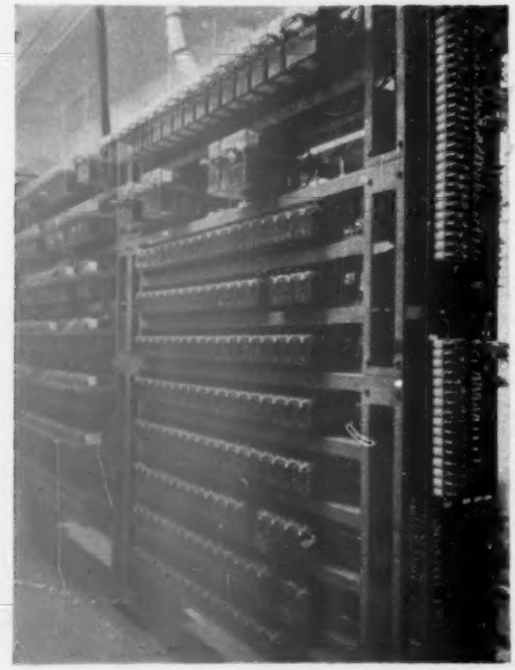

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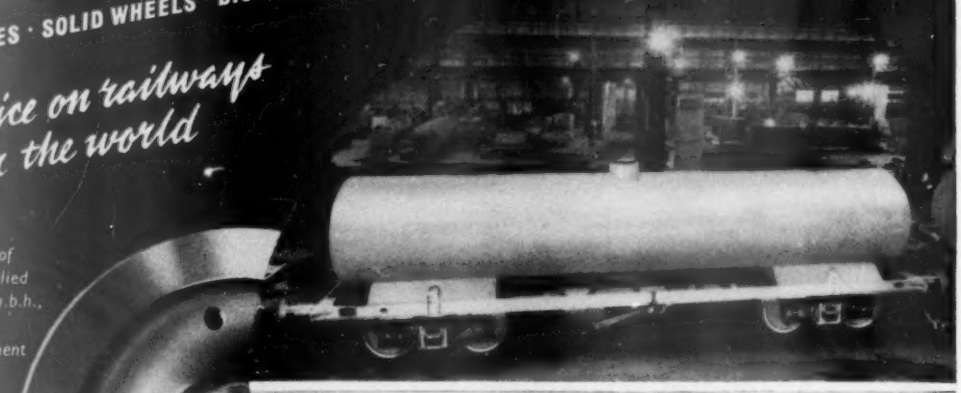
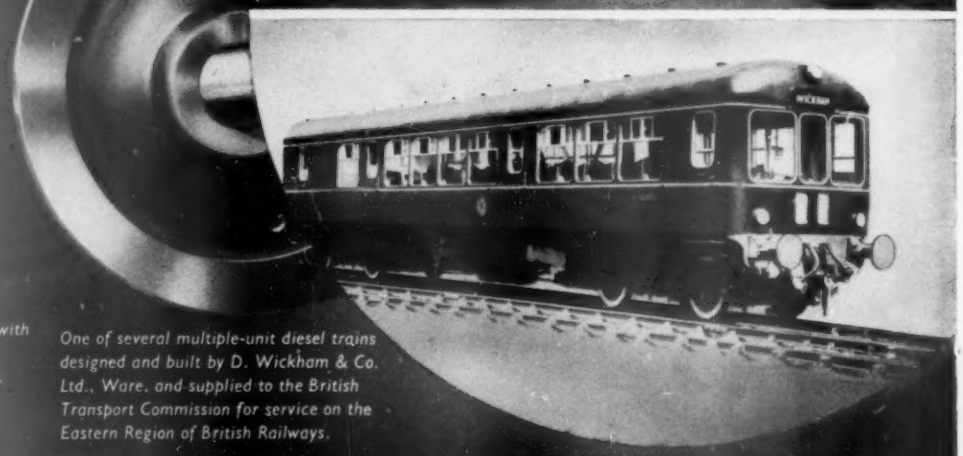


One of a number of tank wagons supplied by Rax-Werk G.m.b.h., Austria, to the Pakistan Government Railways.

B
B



All the vehicles shown are fitted with Baker-Bessemer wheels and axles.

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Antofagasta & Bolivia Railway orders 6 Model GR12

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This British-owned Railway Company which runs over the Andes linking the Port of Antofagasta in Northern Chile with Bolivia, Argentine and the Chilian State Railways, hauls copper shipments from, and supplies to, the famous Chuquicamata Mine and traverses the Atacama Desert, where it scarcely ever rains.

To improve its traffic movement, the Antofagasta (Chili) & Bolivia Railway Company, Ltd., is replacing steam locomotives with a fleet of six Model GR12 General Motors Diesel-Electric locomotives, to operate principally between Antofagasta and Calama, from sea-level to 7,460 ft., over a distance of 150 miles with maximum grades of 3 per cent.

These 1,425 h.p. six-axle, six-motor locomotives are designed to haul heavy tonnage on light rail, and over the Antofagasta & Bolivia 65 lb. metre gauge track will haul bigger trains, cut down present operating time, obviate the use of water, gain advantage of dynamic braking on the long downgrade run.

Improvements like this in service, along with the traditional operating economies of General Motors locomotives, explain why railways the world over are " going Diesel " with General Motors locomotives.

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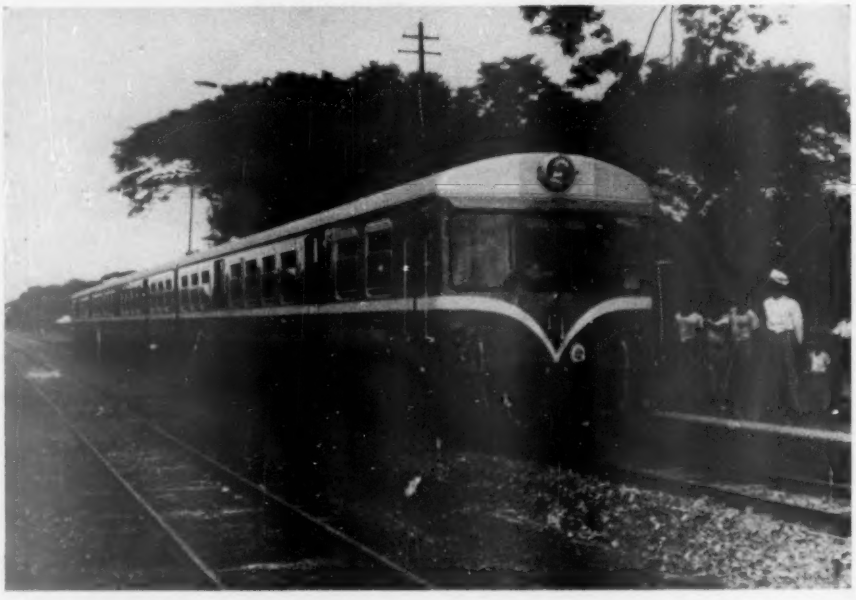

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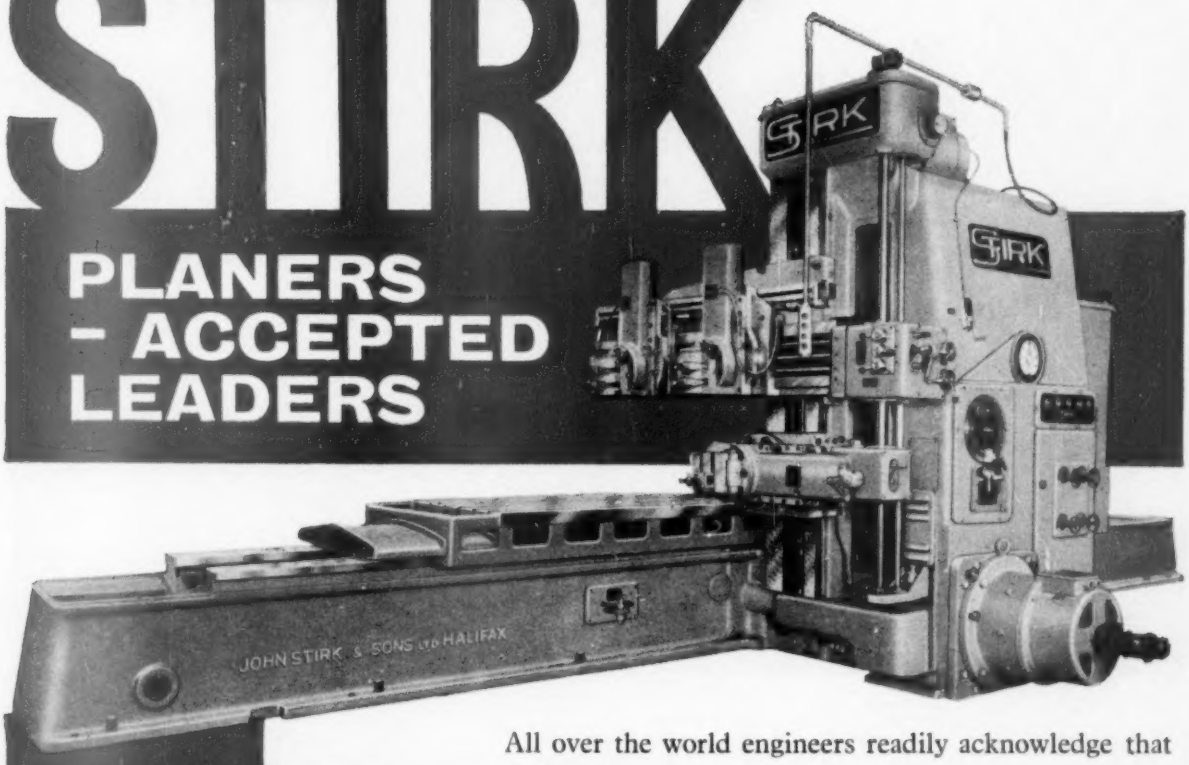

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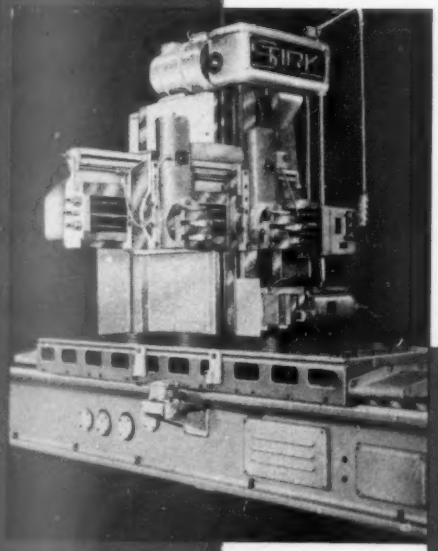

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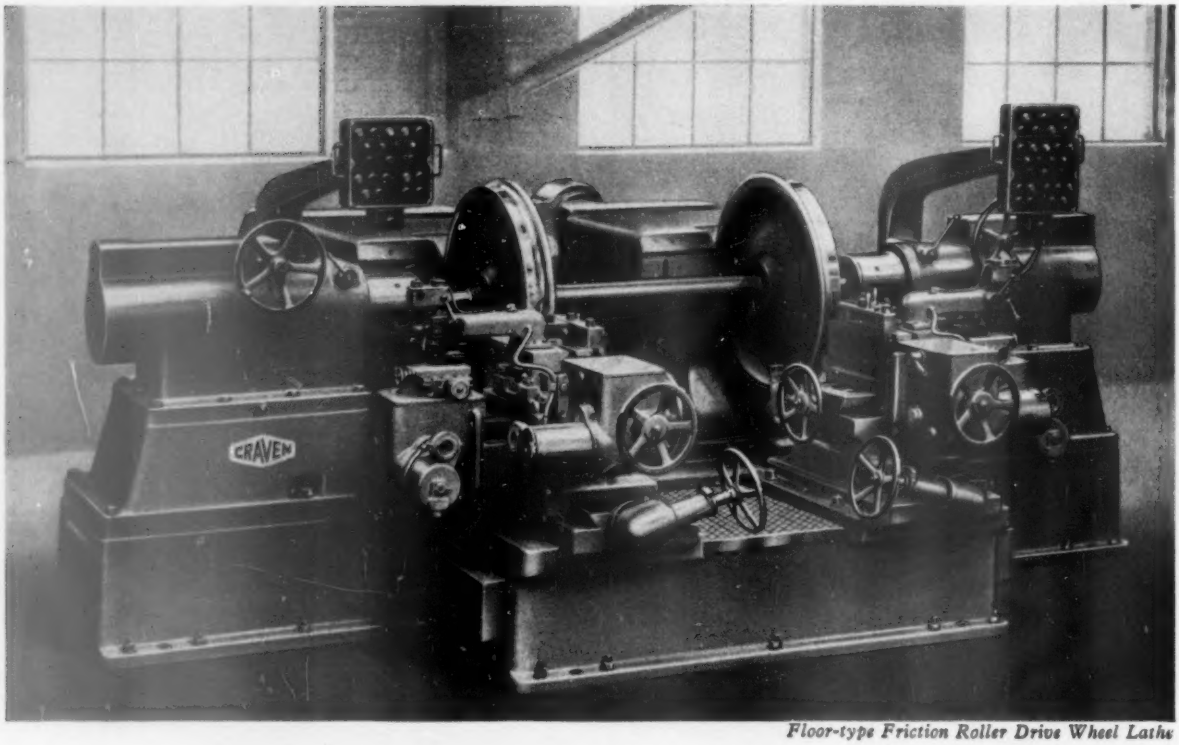

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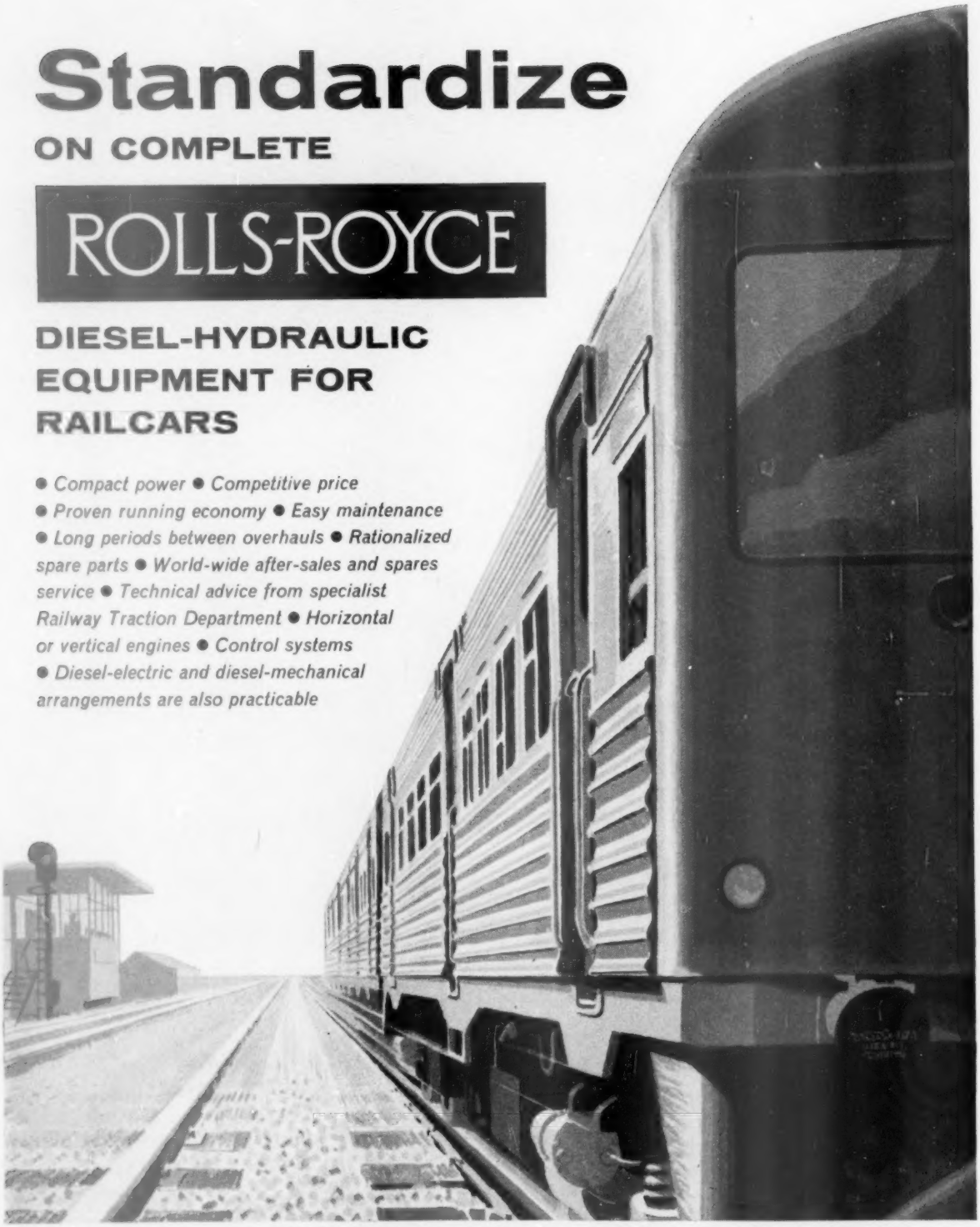

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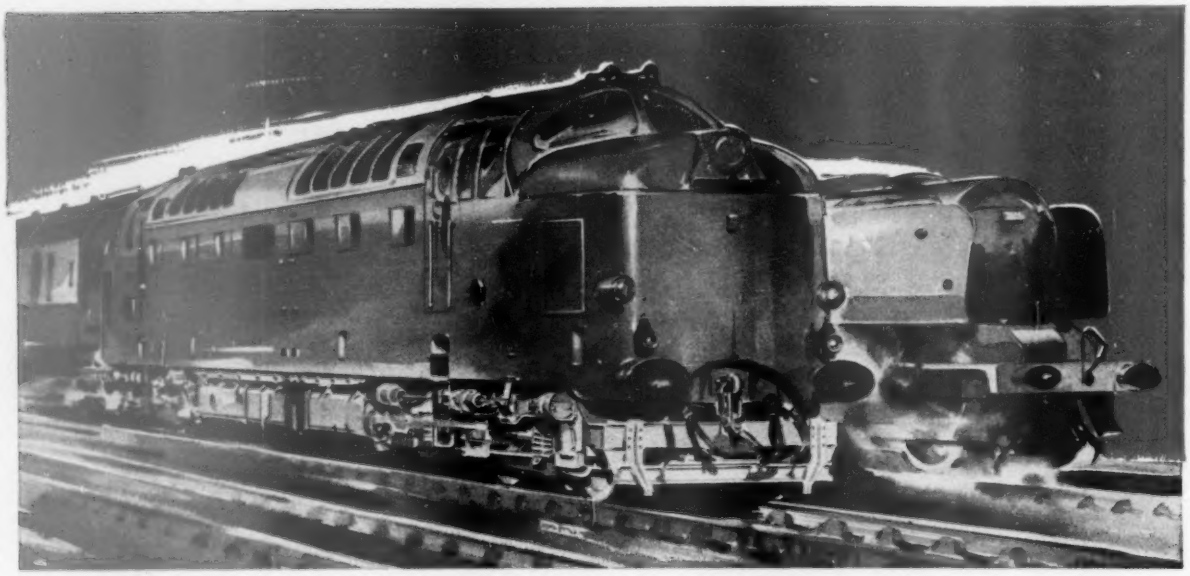

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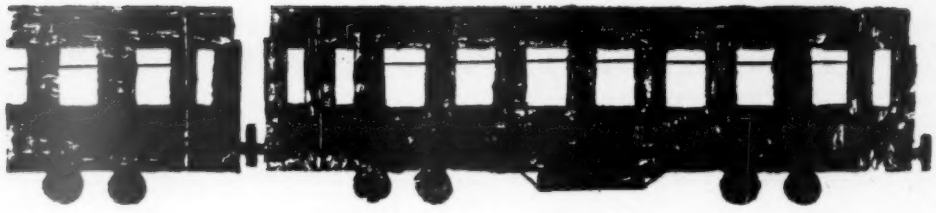

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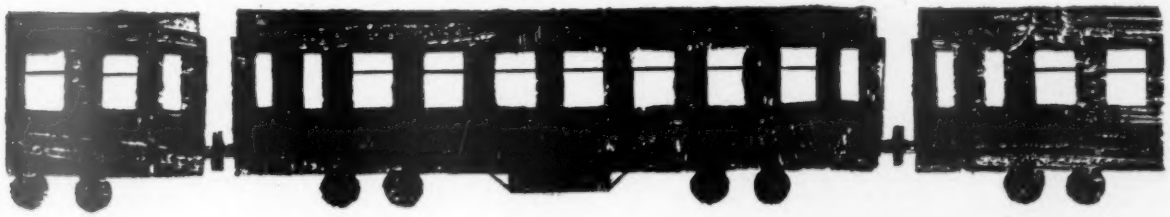

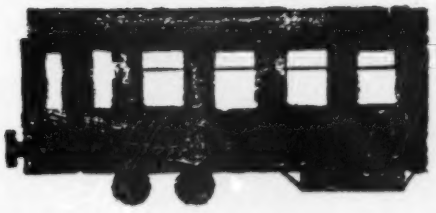

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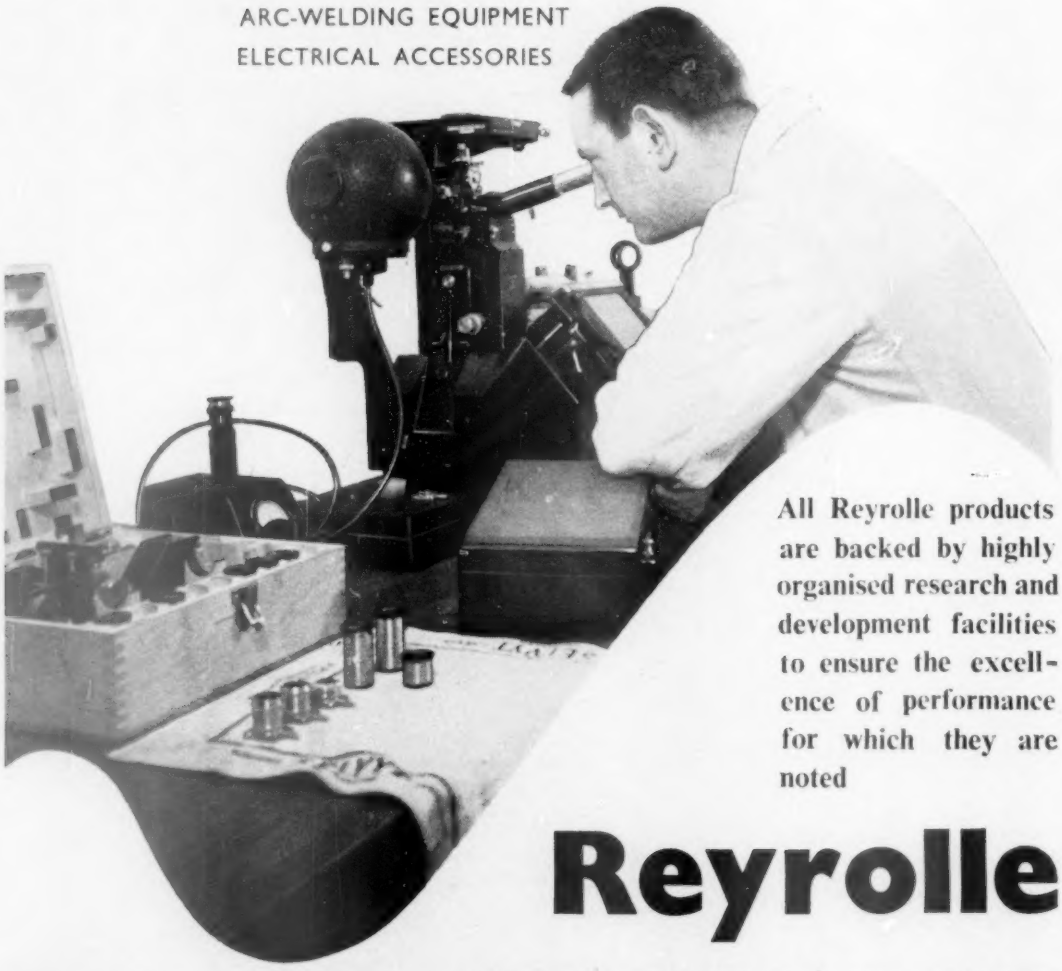

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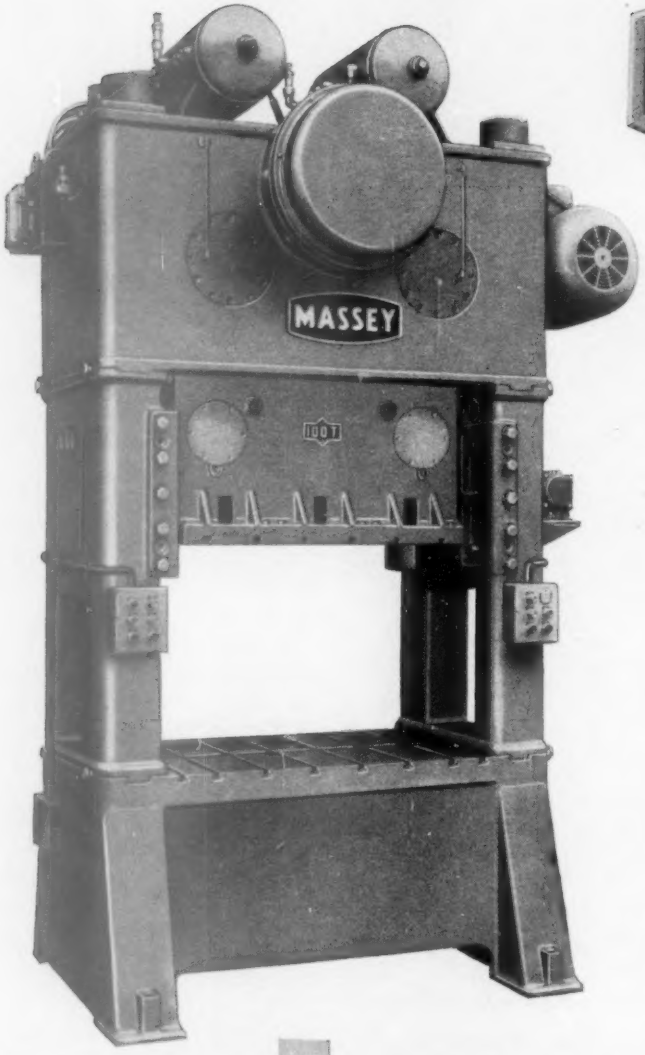

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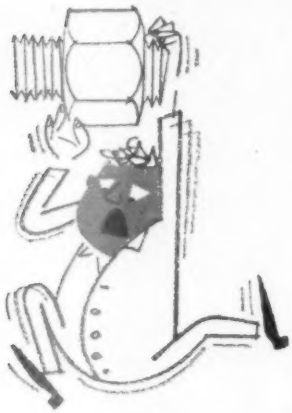

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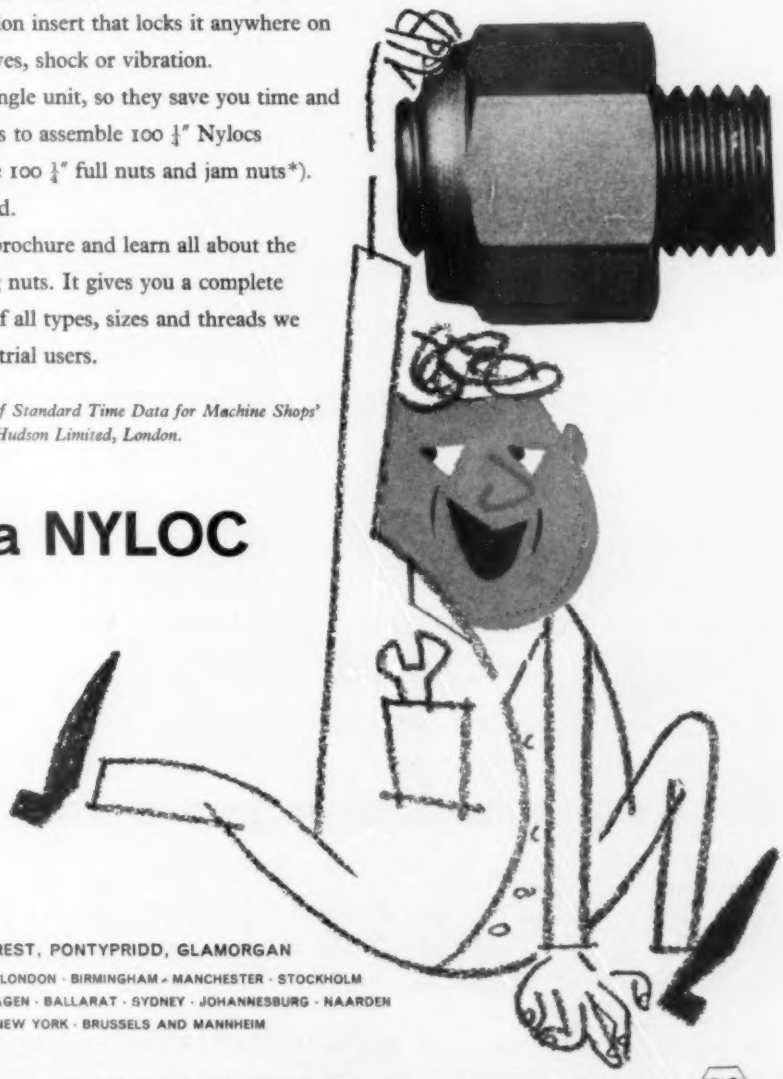
* *These times are based on 'The Handbook of Standard Time Data for Machine Shops' by Haddon & Genger, published by Thames & Hudson Limited, London.*



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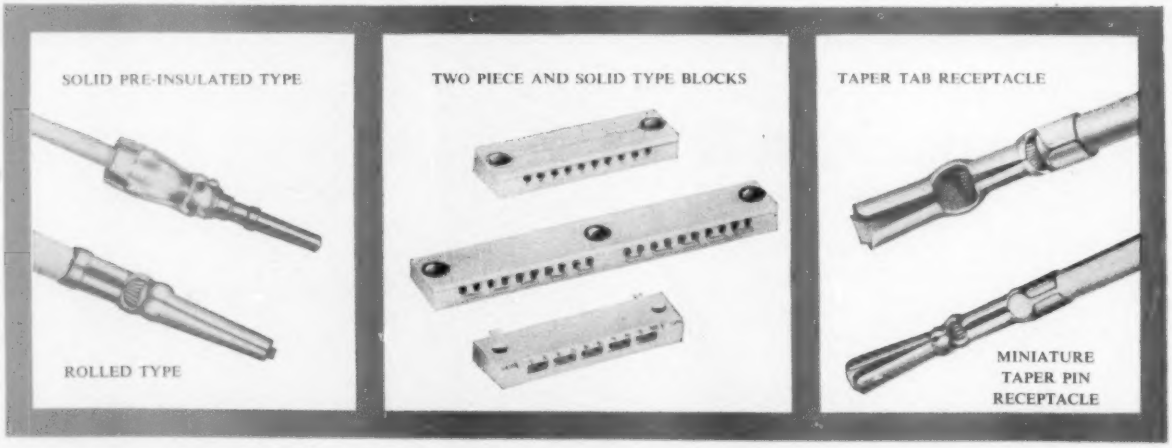

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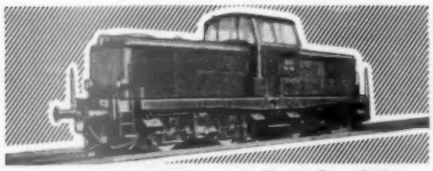
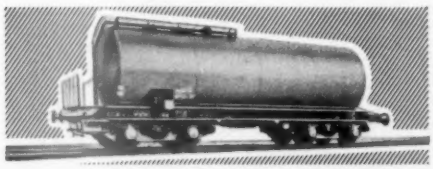
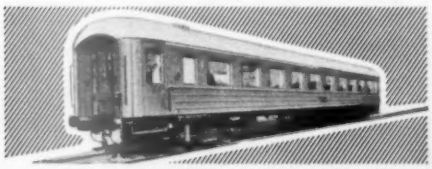


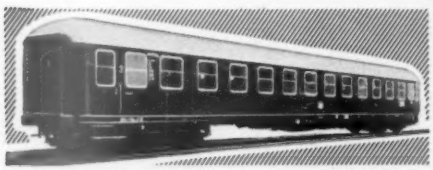
Diesel locomotive of the Danish State Railways, built by A/S Frichs, Aarhus



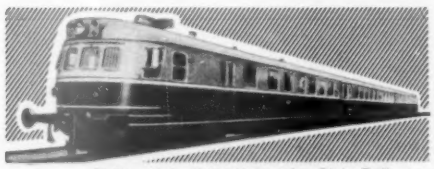
Tank wagon of the Iranian State Railways, built by Linke-Hofmann-Busch, Salzgitter Watenstedt



Passenger coach of the Swedish company TGOJ, built by Kockums, Malmö



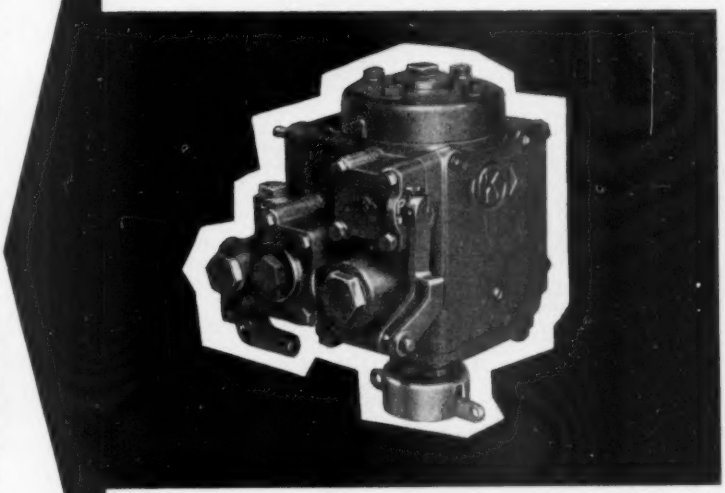
Express train coach of the German Federal Railways, built by Rathgeber, Munich



Railcar train of the Norwegian State Railways, built by A/S Strömmens Vaerksted, Strömmens

Single-engined railbus of the British Railways, built by Waggon- und Maschinenbau GmbH, Donauwörth

Knorr KE Type Air-Brakes for all Rail Vehicles



This **KE** universal triple valve forms the basis of the brake equipment for all types of rolling stock: locomotives, passenger coaches and goods wagons as well as railcars and railbuses. By the attachment of accessory components the action of the valve can be extended to meet the highest demands. The Knorr KE air-brake offers the maximum degree of security and economy. Up to now KE brakes have been supplied to 28 countries in the world.

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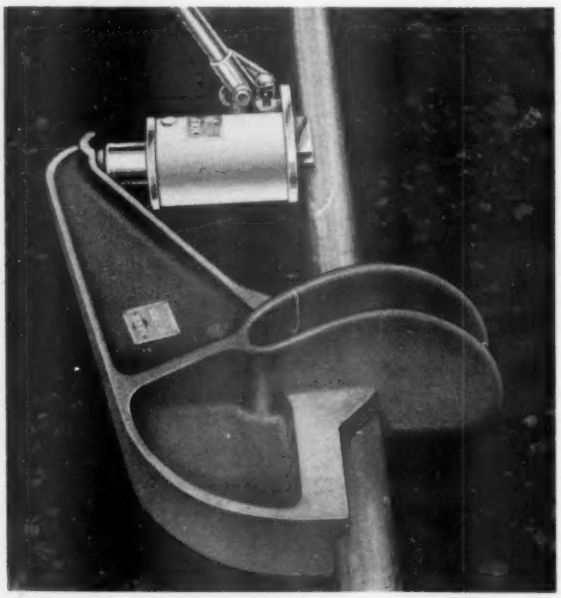

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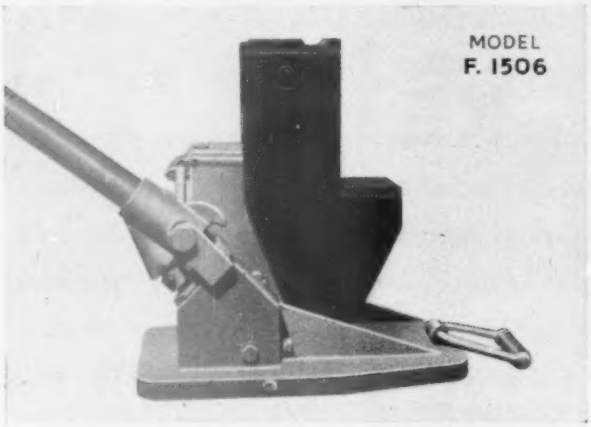

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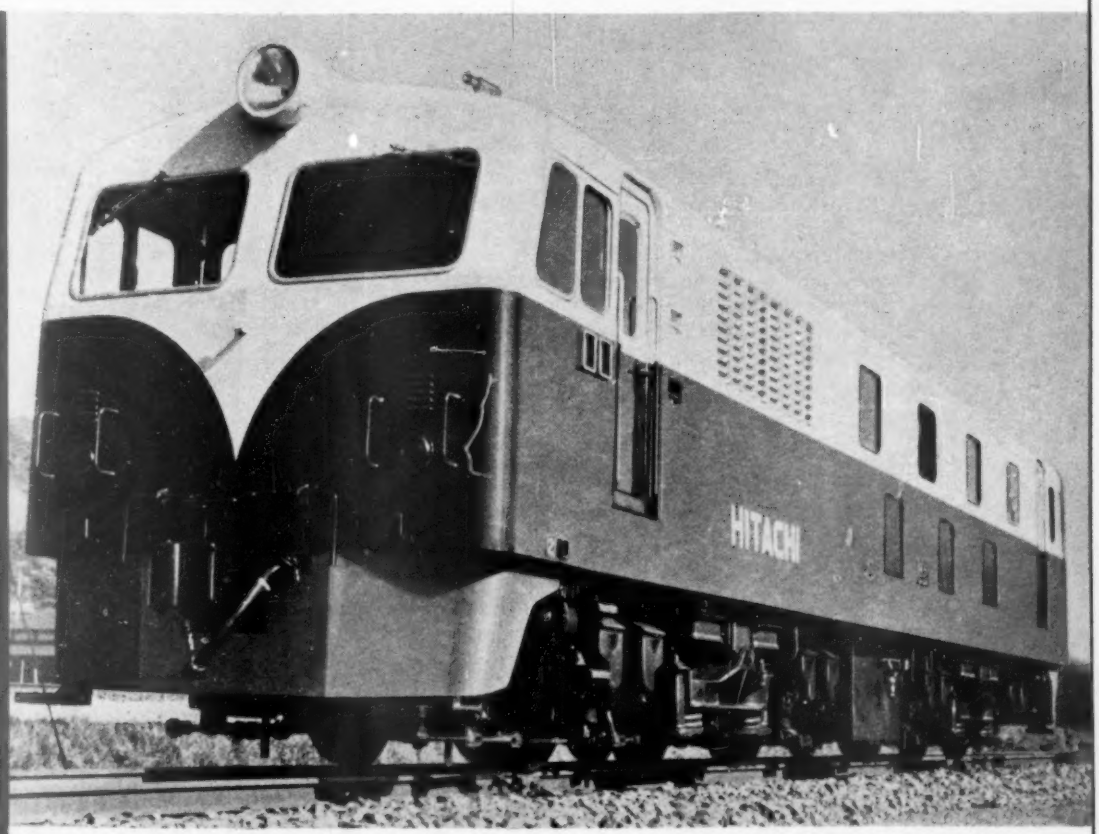

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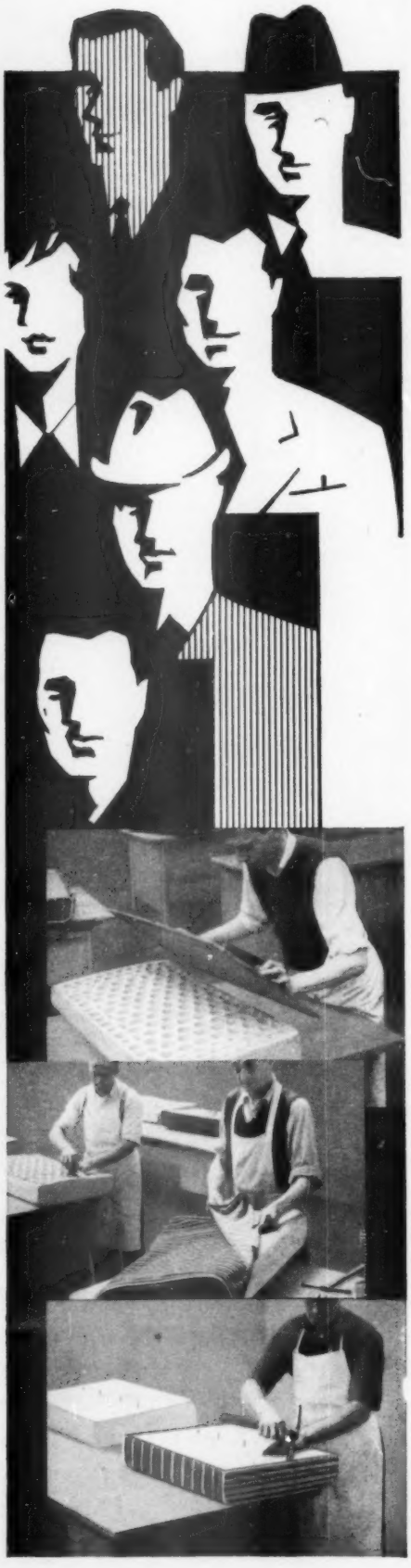

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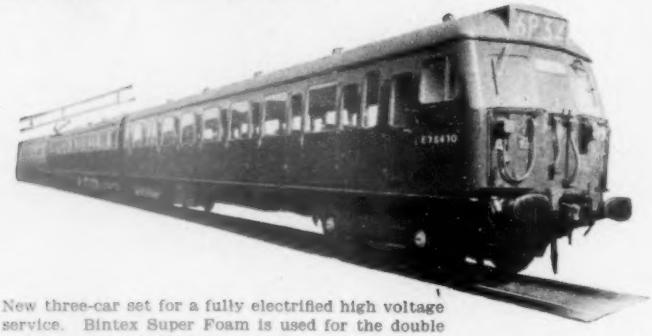

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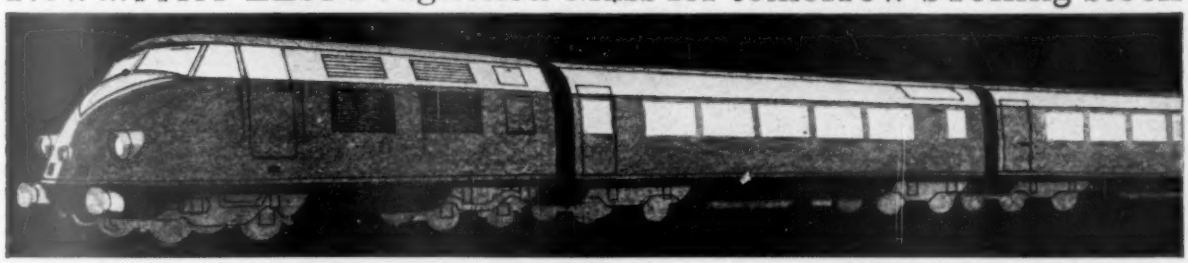

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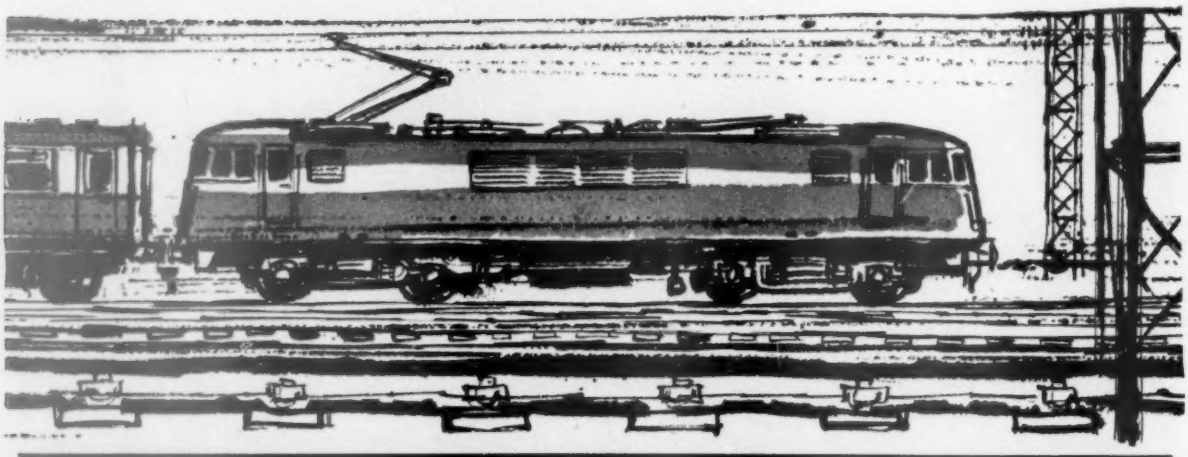
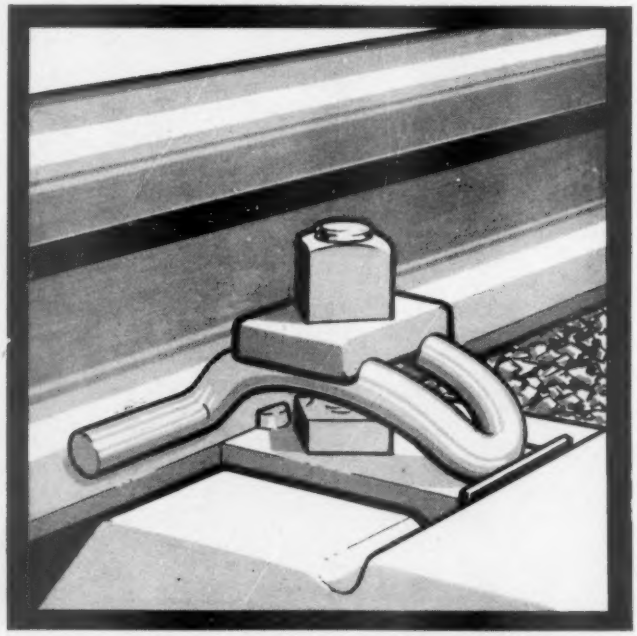


KEEP TRACK

Today's 100 m.p.h. traffic makes big demands on the track. To help cope with this problem, Bayliss, Jones & Bayliss have developed resilient rail fastenings for use with concrete sleepers and long welded rails. Approved by the British Transport Commission, these tough spring steel fastenings are the latest additions to the BJB range, which still includes, of course, many traditional types of fastening.



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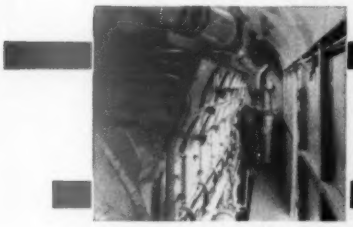
At Henley Park, the headquarters of the Vokes Group, over 10,000 sq. ft. of space is devoted to the modern and well equipped filtration research and development laboratories. Here, besides testing the efficiency of existing filters in accordance with standards laid down by the British Standards Institute, investigations into design problems connected with new applications are carried out, often in close co-operation with large industrial and government organizations.

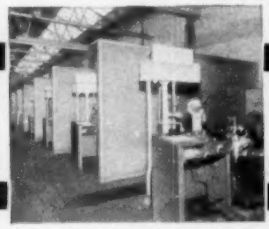
The *unique* guaranteed filter performance figures which exhaustive laboratory tests make possible, enable companies to standardize on Vokes filters with complete confidence.

The two Vokes lubricating oil filters illustrated are part of a comprehensive range developed and tested in the fluid filter test laboratory shown above. They are guaranteed by Vokes for the complete protection of modern bearings and gear boxes.

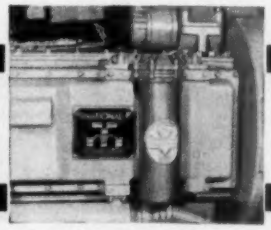
Left is a lube oil filter, incorporating the unique Vokes by-pass device, designed to filter oil carried in external piping. Its outstanding, easily renewed VAF 66 filter cartridge has, compared with other similar size elements, greater sludge holding capacity, considerably improved flow characteristics and longer life. Above is a 'Top Servicing' lube oil filter, with VAF 2 filter element, featuring a single articulated clamp ring which considerably simplifies element renewal. Vokes lubricating oil filters are inexpensive on first cost, simple to install and the most economical in use.



Vokes 'Top Servicing' filter fitted alongside the Mirrlees engine of a Type 2 loco built for British Railways by Brush Traction Limited.



Two Vokes 'Top Servicing' filters serve the 24 bays of the Test Shop of Tilling-Stevens Ltd., a member of the Rootes Group.



Vokes lubricating oil filter fitted to a diesel engine manufactured by the National Gas & Oil Engine Co. Ltd.

We are indebted to the companies concerned for permission to reproduce these photographs.

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V.551

C*

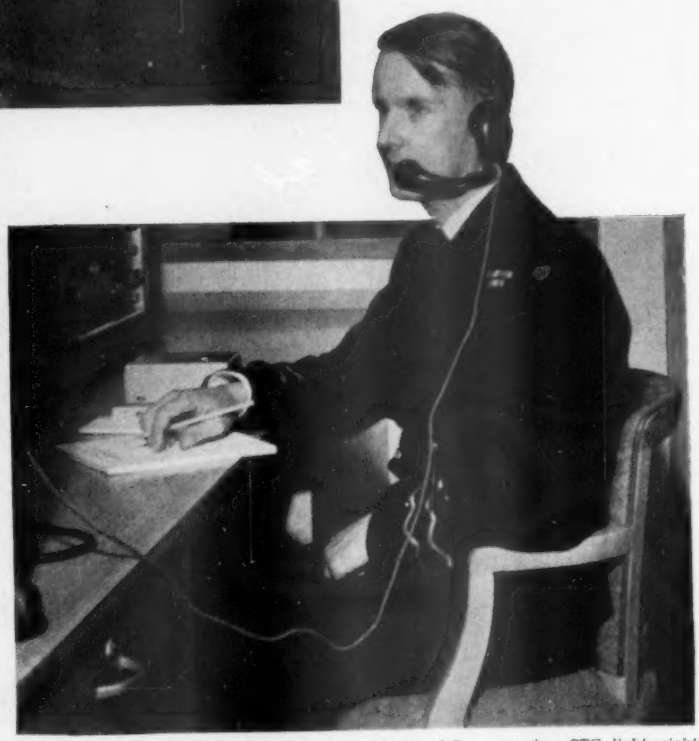
At London Airport, BEA Apron Control have reorganised their communication facilities to cater for their 400 air movements a day peak load. The controllers use STC Lightweight transmitter/receiver headsets to assist them with strain-free operation.

WIDER USE FOR STC lightweight headsets

Designed primarily for use by private and public telephone operators and approved by the British Post Office, STC Lightweight Headsets are now being widely used for other applications. Authorities and operators concerned with audio monitoring and control have quickly recognized the advantages in comfort and sensitivity provided by this new design.

The "Rocking Armature" principle which gives improved sensitivity and frequency response—an important STC development in telephone receiver design—has been incorporated into these instruments.

The main advantages of this STC product are: extraordinary light weight, a high degree of comfort, stability and manoeuvrability and constant level of transmission regardless of head movement. Available in black or ivory nylon plastic which is virtually unbreakable.



R.M.S. Windsor Castle Radio Officer wearing STC lightweight headset.

STC Lightweight Head Receiver in use at Broadcasting House. These instruments have been adopted by the B.B.C. for use in their London and provincial studios.

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61/1D

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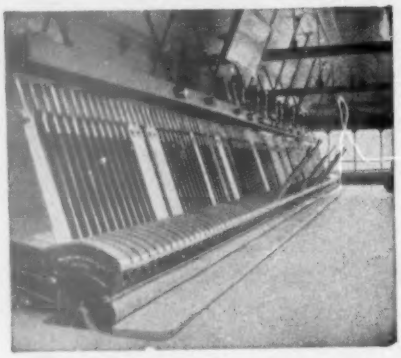

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BECLAWAT FOR WINDOWS

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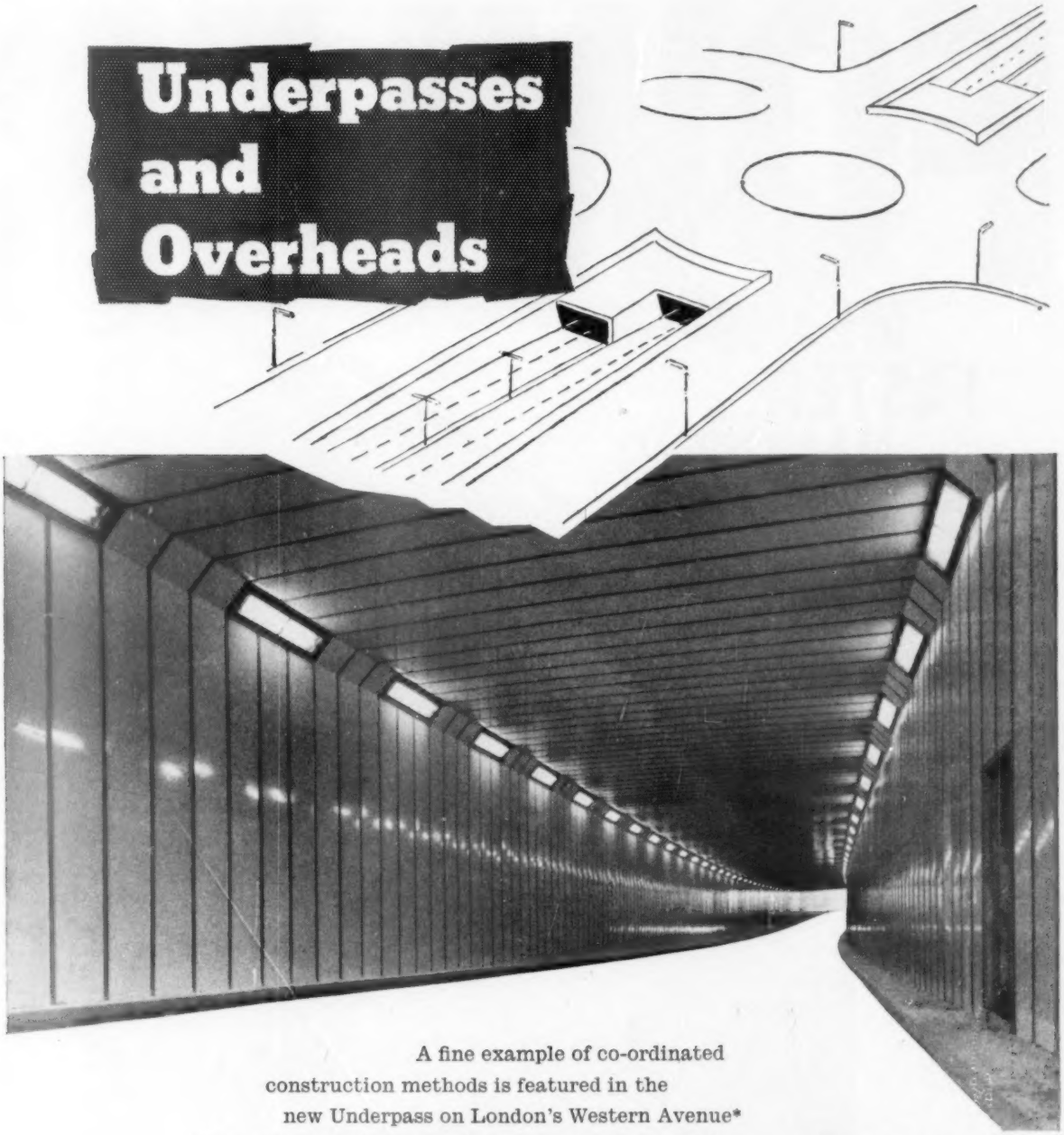
Underpasses and Overheads



A fine example of co-ordinated construction methods is featured in the new Underpass on London's Western Avenue* where Aluminium Alloy extrusions, manufactured by Southern Forge Ltd., are used throughout for framing the interior walls. Strong, durable and light to handle, Alminal Aluminium Alloy provides a versatile and economic material in modern building and road construction.

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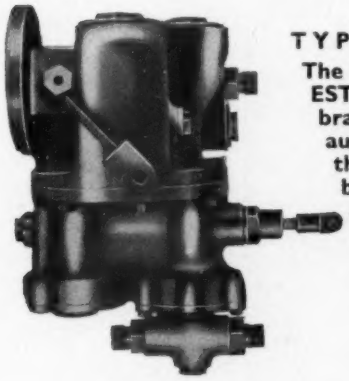
Carriages and Wagons

OERLIKON PATENT DESIGN

TYPE EST3d.

This standard and basic design of Triple Valve enables the controlled application and release of brakes on goods and passenger trains. It is suitable for all sizes of brake cylinder and is in accordance with the conditions laid down for the admission of goods and passenger trains for international traffic. Leaflet A.9.

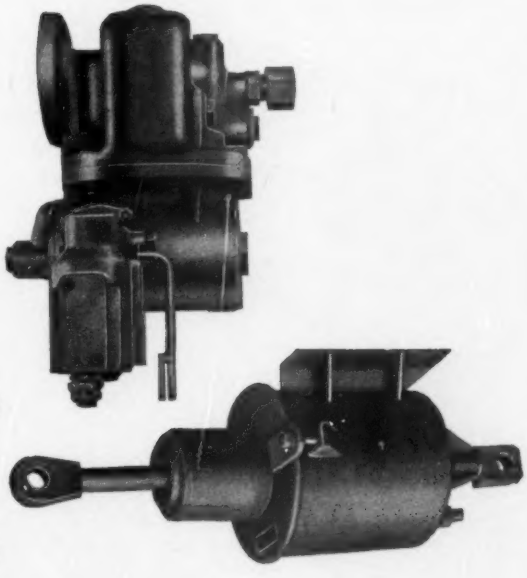


TYPE EST4d/AL.

The AL device used in conjunction with the EST Triple Valve, as illustrated, enables the brake cylinder pressure to be regulated automatically in proportion to the load on the vehicle, thus enabling the maximum brake efficiency to be obtained under all conditions. Among the advantages associated with this equipment are the simplicity of installation, further, the brake cylinder filling and releasing times are unaffected by load changes. Leaflet A.8

TYPE EST4d/R TRIPLE VALVE

In this instance the type R device has been added to the EST Triple Valve to enable two-stage braking to be obtained. This arrangement when applied to high speed passenger coaches and controlled by the vehicle speed enables the maximum brake efficiency to be obtained and greatly reduces the distance required for stopping a train. This style may also be used for simple load and empty braking with the two stages Hand controlled. Leaflet A.5.



TYPE SB BRAKE CYLINDER

(Made under licence from STABEG)

A simple lightweight design of Brake Cylinder embodying a patent piston seal giving automatic lubrication to the cylinder walls and exceptionally long life to the seal. A further patent covers a security device which simplifies maintenance and examination of the Cylinder which is made in all standard sizes and styles. Leaflet A.14.

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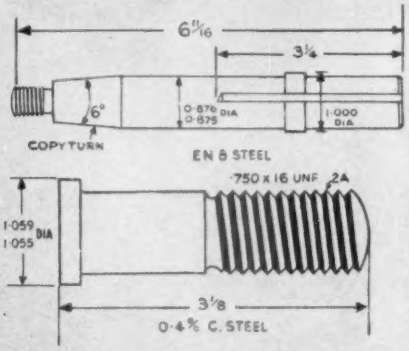
DOUBLE-SLIDE CAPSTAN LATHES



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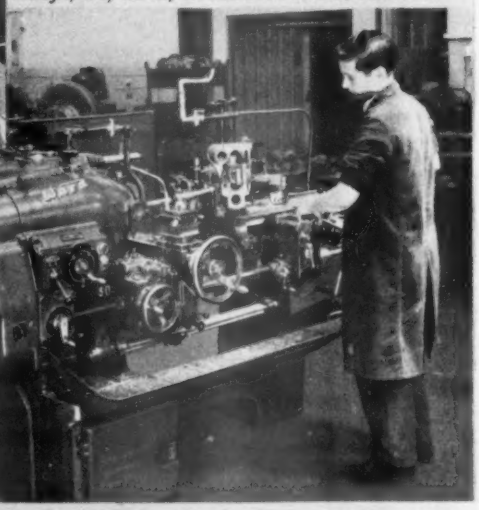

The New DOUBLE-SLIDE allows heavier work with higher rates of removal and provides

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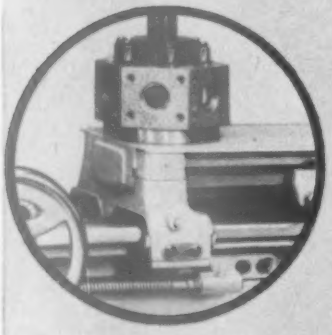

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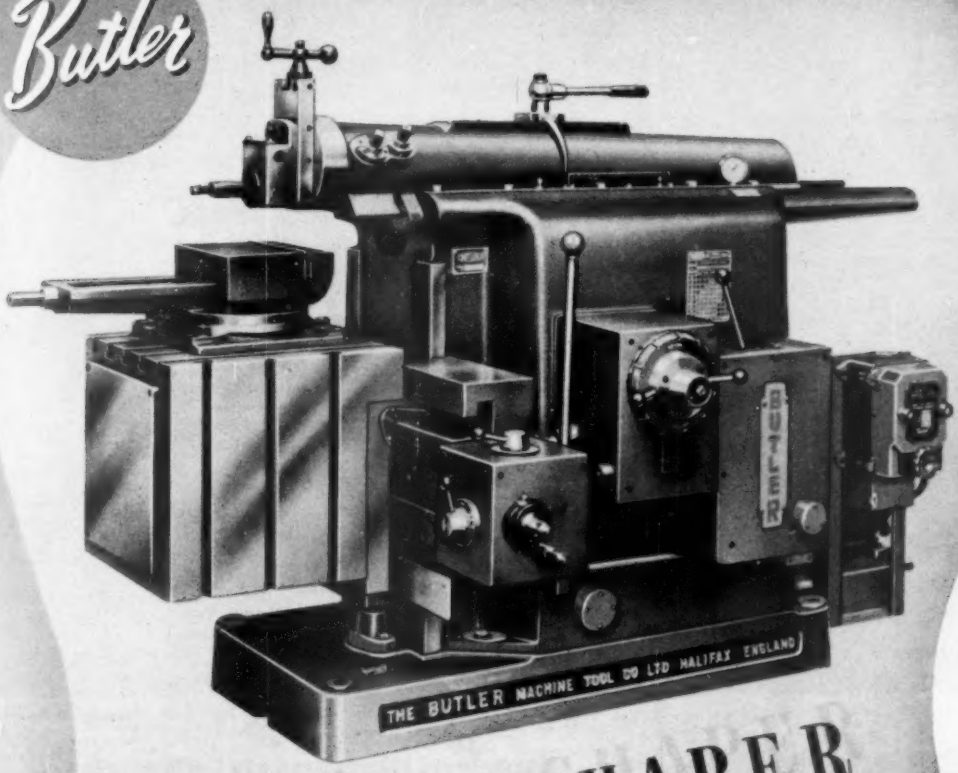

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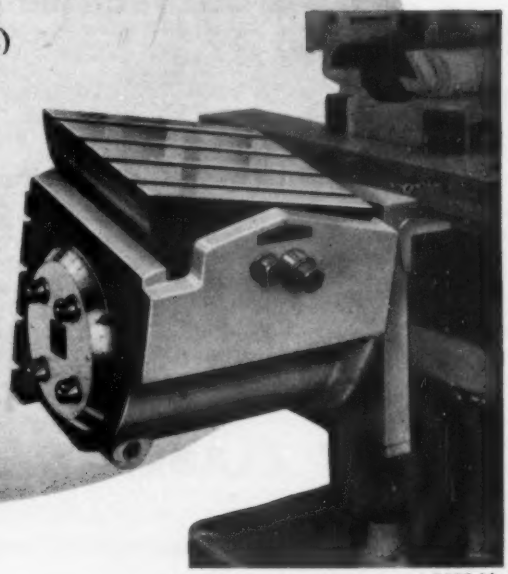

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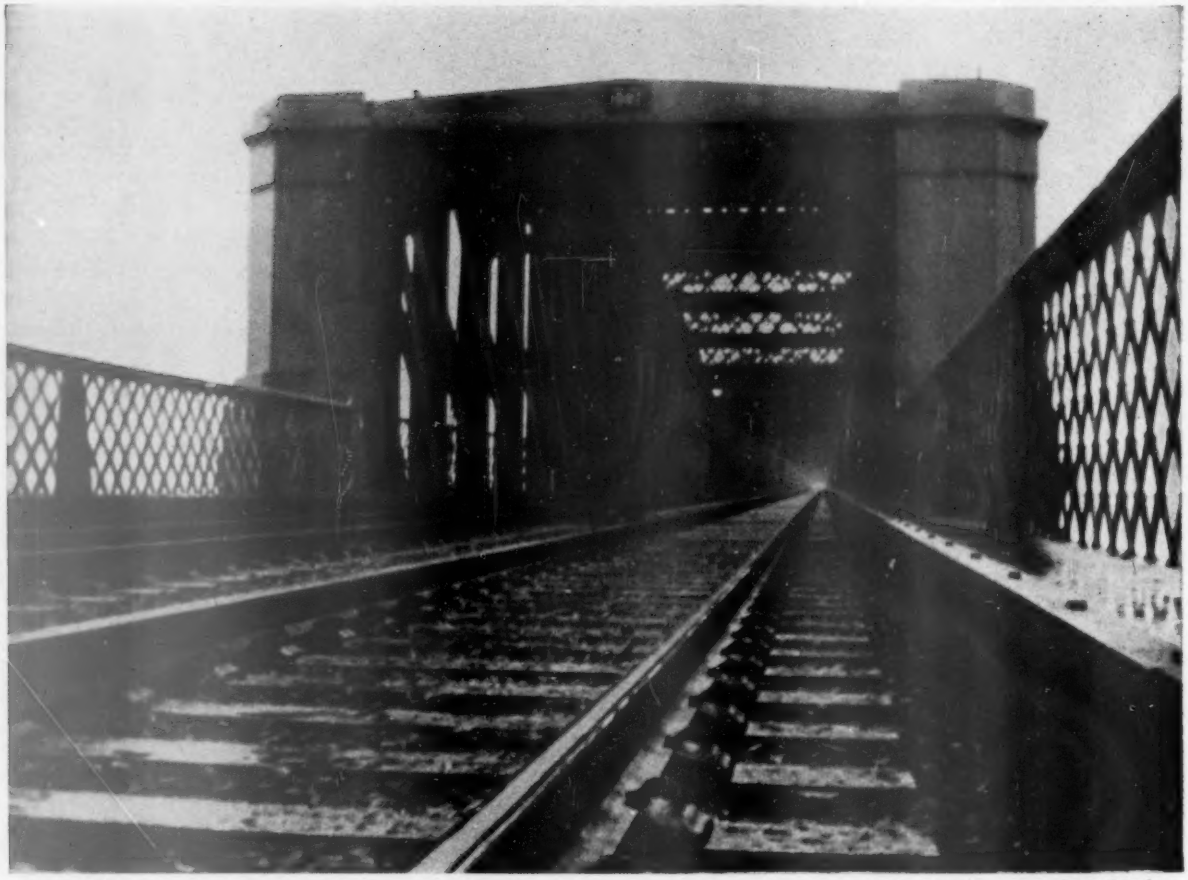

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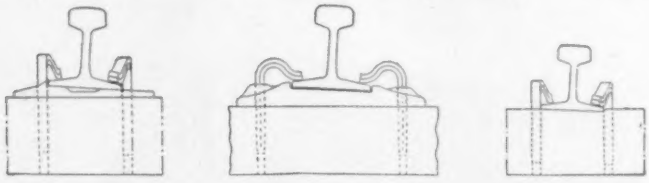

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An unwise attitude

Two aspects of the present attitude of the National Union of Railwaymen toward British railway management are belligerent in their concepts and unwise in their expression, particularly at the present time, when diplomacy is called for from both management and men if the railways are to survive in any recognisable form. In his presidential address on July 3 on the opening day of the union's annual conference in Edinburgh, Mr. W. H. Rathbone warned the British Transport Commission that his union would not hold back its claims for increased wages while the problems of railway organisation were sorted out. (All three railway unions have submitted claims for more pay: the N.U.R. wants "a substantial increase" for salaried and conciliation staff; A.S.L.E.F. seeks a 10 per cent increase, and T.S.S.A. has asked for a rise for salaried grades in accordance with the principles established by the Guillebaud report). Also at Edinburgh, a resolution was passed stating that the unions must have a greater say on the area boards of the British Transport Commission and that their representatives should be backed by committees of railway workers who are members of trade unions. It is difficult to imagine what the N.U.R. hopes to achieve by stating these objectives, neither of which is likely to meet with non-union approval, so forcibly and at such an ill-timed juncture. The separate functions of administration and of men are well known and clearly defined: while good management will always welcome negotiation and co-operation between both sides on matters of conditions of work and pay, it will not brook any interference with its own function of administration, any more than will the men suffer interference in their actual function of carrying out their separate tasks. Neither can the N.U.R. deny that it already has representation with the Commission: two of its members are on present area boards of the British Transport Commission and one of its former leading lights is the Deputy Chairman of the Commission itself. If the argument is addressed not to the present area boards but to the proposed Regional boards, it seems rather early to put it forward. All that is known of these boards is that their members will be few in number and that there will be a strong element of full-time members.

Getting off on the wrong foot

THE union is also unwise in taking up a stand which may well antagonise the new Chairman of the British Transport Commission, Dr. Richard Beeching. At present, there is every indication that Dr. Beeching is well disposed toward British railwaymen: he is taking great pains to become personally acquainted with large numbers of officers and men, and the impressions he has made have gone far toward allaying many fears which had sprung up in the absence of a properly-defined Government attitude toward the future of British Railways. It is generally believed that the Government is not favourably disposed toward the railways: it will not help their cause if the new Chairman, himself a Government nominee, encounters a truculent and unco-operative attitude from rank-and-file railwaymen at the very outset of his tenure of office.

Increase in engineering output

BOARD of Trade statistics are always a little late in their appearance, but those relating to engineering orders in the earlier months of this year give cause for some satisfaction. The increase indicated in March continued in April. The rise in the latter month was about 18 per cent on the like period a year earlier. It is less satisfactory that net new export orders dropped from the March index number of 150 to 98 in April. The published statistics of new export orders in the first quarter of this year have now been revised upwards. They are estimated to have been 4 per cent more than a year earlier. Despite increased deliveries, order books have lengthened. By the end of April the volume of new orders on hand was 10 per cent greater than at the beginning of the year and new orders for the home market were some 12 per cent higher. Volume of production in the engineering and electrical goods industry in

April is about 9 per cent more than a year earlier; if March and April are taken together to eliminate the different incidence at Easter, the figure is 5 per cent higher.

Pakistan Railways plans

MR. F. M. KAHN, the Pakistan Minister for Railways & Communications, has announced arrangements to commence the manufacture of signalling equipment locally. In presenting his first budget for the Pakistan Railways he is also reported to have said that experiments in the manufacture of modern all-steel coaches in the railway workshops were proposed. The adoption of all steel integral passenger coaches as a future standard was one of the measures which it was proposed should be taken to provide greater safety. He added that there would be no change in the fare and freight charges and that modernisation would be the keynote of the second Five-year plan programme. He estimated profits for 1961 and 1962 at about £7,400,000 of which over £5,500,000 would be paid to general revenues as a railways contribution under the separation convention leaving a balance of about £1,800,000 after certain other charges for the railways.

Civil Research Council

AT A conference arranged at the Institution of Civil Engineers, on July 5, the formation was announced of a Civil Engineering Research Council. This Council has been set up by the Institution, the Federation of Civil Engineering Contractors, and the Association of Consulting Engineers. The President of the Council, Sir Herbert Manzoni, in an appeal for funds, said that advances in any field are only made through patient and thoughtful research and experiment. To a considerable extent this has been lacking in the civil engineering field in this country during the 20th century, as the Advisory Council on Scientific Policy stated in its 1959-60 Report. To rectify this situation the Civil Engineering Research Council has been set up. This joint effort indicates the importance which each branch of the profession attaches to it. The Research Council does not intend, at least in the first instance, to establish a special laboratory; as before, use will be made of the facilities provided by the Department of Scientific & Industrial Research, the Research Associations, the universities and industry.

Nyasaland Railways

NYASALAND Railways Limited last year showed improvement in its financial results. A preliminary statement of group profits for the year to December 31 last gives the net operating profit before taxation on £394,589, which compares with £388,804 for 1959. This was after providing £153,085 (against £149,797 for the previous year) for renewal of fixed assets and also £15,000 for deferred locomotive repairs. The company has brought in £73,040 of other income and provisions no longer required, against £36,275 on the previous occasion. The balance brought forward was only £29,218 compared with £92,640 in 1959 but the amount available was £536,847 against £517,719. After interest on debenture stocks and on a loan from the Nyasaland Government as well as on hire purchase payments and making provision of £100,791 for taxation, it is placing £4,296 (against £2,209) to tax equalisation reserve. Adjustment of receipts relating to previous years amounted to £12,305. It is increasing by £10,000 to £55,000 the amount placed to reserve for increased cost of replacement of fixed assets. The dividend recommended on the ordinary shares is again 6 per cent.

Re-signalling at Newport

NEWPORT, Monmouthshire, on the Western Region of British Railways, has long been an obvious opportunity for a major re-signalling scheme, but the construction of Spencer Street Works at Llanwern a few miles to the east, and the consequent track re-arrangement in that locality, made the execution of such a scheme imperative. The work is proceeding in six stages. Ultimately, there will be a route-setting panel-type signalbox just to the east of Newport Station, which will control the major part of the Newport area, comprising 67 track-miles of line with 396 routes. It will be one of the major signalling installations in the country. This work will not be finished until the end of next year and, meanwhile, Stage 1, from Magor to the bridge over the River Usk, has been completed in readiness for the opening of the steelworks.

Rail data processing unit for S.N.C.F.

LAST month, the French National Railways installed a £700,000 data processing unit, claimed to be the largest of its kind in Europe. The unit consists basically of a Gamma 60 computer supplied by Machines Bull of France. It is installed next to Auteuil Station, on the western side of Paris. It contains both arithmetical and logical calculators and a memory equal in capacity to the present filing system of the whole of the French Railways. It can process up to 200,000 figures a minute and is estimated to be 1,000 times faster than the 12 groups of mechanical punched card machines it eventually will replace. At present used for pay-slip work, it will soon be used to work out pensions and bonuses and ultimately will take over the whole range of accounting, including the calculation of costs, for each operation. It will also work out the most economical distribution and use of trucks. Capable of handling more than one operation at the same time, it requires only 40 men in its operation.

Multi-channel radio-telephone for B.R.

As part of British Railways' modernisation programme, the North Eastern Region is to be equipped with a super-high-frequency multi-channel radio telephone system between York and Newcastle via Darlington—a distance of 78 miles. This will be the first multi-channel radio telephone and telegraph installation to be used by British Railways and the first "private" multi-channel service in Britain to operate on a frequency of 7,500 megacycles. The radio equipment is to be supplied and installed by the Marconi's Wireless Telegraph Co. Ltd. and the carrier equipment by the Automatic Telephone & Electric Co. Ltd. The system will handle telephone traffic between regional centres, with full facilities for through subscriber trunk dialling; ultimately its use may be extended to provide facilities for high-speed data transmission. Two repeater stations will be used: one at Woolmoor between York and Darlington, and the other at Ferryhill between Darlington and Newcastle. A survey of the route is being carried out by Marconi engineers and the contract is scheduled for completion in 15 months.

Metropolitan Line trains

APART from the novelty of providing saloon accommodation on services long wedded to compartments, the new trains for the Metropolitan Line of London Transport (described last week) broke fresh ground in some electrical features. They represent the first extensive application of 300-V. motors in L.T.E. stock, and the permanent series connection of the two machines in each motor bogie has enabled the four motors in a motor coach to be controlled by one camshaft controller differing only in minor respects from those previously used with duo-motor equipments. Two motor coaches are in each four-coach set, and in the event of an electrical failure of a traction motor it is the practice to isolate a complete equipment by operating a cutout switch in the vehicle affected. Two rates of acceleration are available: the lower one is selected automatically when the weak-field switch is operated. When working in full field, either rate may be chosen by means of

alternative forward positions of the reverser handle. Fluorescent lighting has dictated the use of an alternator for auxiliary supplies, which are rectified for those services requiring direct current. If the traction supply fails, transistor-inverter units keep a proportion of the fluorescent tubes in operation from the battery.

British Transport Commission traffic receipts

THE British Transport Commission traffic receipts for the four weeks ended June 18, 1961, do not present an encouraging picture. Passenger traffic receipts are down compared with the corresponding period last year, a matter of £462,000. Although the Whit holiday period was included in last year's figures and not in the latest four-weekly period, such a drop in receipts can hardly be due to that alone. On the freight side it is more cheering to note that coal and coke receipts increased by £185,000 when compared with last year's four weekly figure but parcels traffic declined to the extent of £100,000.

PERCENTAGE VARIATION 1961 COMPARED WITH 1960

	Four weeks to June 18, 1961	24 weeks to June 18, 1961
British Railways—		
Passengers	− 3·4	+ 5·9
Parcels	− 2·3	+ 0·2
Merchandise and livestock	− 0·9	+ 0·8
Minerals	− 6·8	− 5·0
Coal & coke	+ 2·4	− 3·0
Total	− 1·9	+ 0·6
Ships, passengers	− 0·2	+ 5·6
British Road Services, Inland Waterways & Ships (cargo)	+ 4·9	+ 8·6
Road Passenger Transport, Provincial & Scottish	+ 4·4	+ 6·1
London Transport—		
Railways	+ 7·0	+ 9·5
Road Services	+ 0·6	+ 3·8
Total	+ 2·5	+ 5·6
Aggregate	− 0·3	+ 2·5

	Four weeks to		Incr. or Decr.	Aggregate for 28 weeks to		Incr. or Decr.
	June 18, 1961	June 19, 1960		June 18, 1961	June 19, 1960	
	1961 £000	1960 £000		1961 £000	1960 £000	
Passengers—						
British Railways	12,801	13,263	− 462	66,480	62,767	+ 3,713
London Transport—Road passenger services	4,588	4,558	+ 30	26,872	25,878	+ 994
Railways	2,110	1,971	+ 139	12,931	11,800	+ 1,131
Provincial & Scottish Buses	5,324	5,099	+ 225	27,914	26,298	+ 1,616
Ships	713	711	+ 2	2,406	2,278	+ 128
Total passengers	25,536	25,602	− 66	136,603	129,021	+ 7,582
Freight, Parcels & Mails—						
British Railways—						
*Merchandise & livestock	7,548	7,622	− 74	47,581	47,182	+ 399
*Minerals	3,370	3,616	− 246	21,669	22,830	− 1,161
*Coal & Coke	7,680	7,495	+ 185	50,091	51,669	− 1,578
*Parcels etc., by coaching train	4,238	4,338	− 100	25,396	25,325	+ 71
†Others	4,756	4,531	+ 225	28,861	26,565	+ 2,296
Total freight, parcels & mails	27,592	27,602	− 10	173,598	173,571	+ 27
Total	53,128	53,204	− 76	310,201	302,592	+ 7,609

* Includes receipts from collection and delivery, etc.
† Receipts from railway movements wholly within dock areas, included in previous periods under "Freight, Parcels and Mails," are now classified as miscellaneous.

B.T.C. annual report and accounts

THE thirteenth annual report and accounts issued by the British Transport Commission (summarised elsewhere in this issue) shows that, while British Railways' working deficit amounts to £67,700,000, a substantial rise has occurred in receipts, which have increased by over £21 million to £478,571,057 gross. Working expenses have increased by £46,800,000, of which £33 million is accounted for by higher rates of pay. The Commission's other undertakings show a working surplus of £31,400,000, an amount £2 million greater than that for 1959 and the best achieved so far. This surplus, deducted from the working deficit of the railways, gives a combined working deficit of £36,300,000.

These figures show encouraging improvements, particularly when it is remembered that four strong factors have been working against the Commission in its struggle to achieve prosperity. First, there has been a recession in coal, iron and steel carryings which dates back to 1958 and which has resulted in a revenue loss of about £30 million in each of the years 1958 and 1959. Steel traffics have since recovered, but not coal. Next, there has been the profound effect on railway finances caused by the implementation of the Guillebaud report, the principle underlying which, though endorsed by both Commission and Government, could not fail to mean further financial difficulty for the railways. The third factor has been the adverse effects produced on passenger travel by both the poor weather of the past twelve months and the increase in privately-owned means of transport : akin to this competition is that experienced in the field of freight traffic from the owners of "C" licence fleets, who are in a strong position to negotiate favourable rates and at the same time to select the traffics they decide to give to the public services. A fourth difficulty which may produce temporary adverse effects arises during the process of modernisation—as an instance, working expenses may be temporarily increased as a result of mixed steam and diesel working, and normal running can be disorganised by engineering works in progress.

Considering the psychological and physical setbacks experienced during the past twelve months the figures are remarkable in showing such substantial improvement. Beginning the year with staff shortages so severe as badly to affect the efficiency of railway services, both passenger and freight, the Commission was under constant pressure from the National Union of Railwaymen to anticipate the report of the Guillebaud Committee and to raise railway pay. During the year, two major inquiries of political origin took place—to state that these were ordeals for everyone concerned on the railways is not to put too fine a point on the matter, for it was obvious that future employment and conditions of work might depend on the recommendations which would emerge. Throughout the whole period, the railways and, to a lesser extent, the Commission's other undertakings, functioned in a constant glare of publicity—much of which was unfavourable—which is not the normal fate of the staff of any private undertaking. Despite these difficulties and despite also the unlooked-for setbacks experienced in connection with some aspects of modernisation, improvements were achieved.

The relatively insignificant increases in passenger railway fares effected during the year did little to ease the overall financial difficulty. By the end of 1960, fares were not yet at parity with the prewar level, taking into account the change in the value of money. The report states that the burden of travel expenditure in relation to income levels has been continually lightened in recent years : hourly earnings of men in industry have risen steadily and substantially, while the average cost for a mile of rail travel has risen only slightly. Yet passenger travel has greatly increased in those areas where fast, comfortable new stock is fulfilling a genuine traffic need, even though at the new prices. Examples of this are provided by the success of the diesel Pullmans and of the diesel multiple-unit stock on the inter-city runs in the London Midland and North Eastern Regions. The inter-city trains have undoubtedly generated new traffic : there are many reports of businessmen who have been won back from the roads and of housewives who travel much farther afield to do their shopping than they had done before diesels replaced the slower, less convenient steam trains.

Another editorial this week directs attention to the pressure which the National Union of Railwaymen intends to exert on the Commission to award still higher rates of pay to its members. This union should reconsider its intention in the

light of the Commission's annual report, which states clearly that the increase in the year's working expenses was accountable to the tune of £33 million to the higher rates of pay which had been awarded during the year. While the principle of a fair wage for railwaymen receives at least lip-acceptance everywhere, it must always be remembered that the word "fair" is in itself a relative term, the precise economic evaluation of which must surely depend on the state of solvency of the organisation to which its employees belong.

British passenger charges

MANY statements of proposal, intention, and legislative sanction in relation to the passenger fare structures of British Railways and London Transport have been made during the past six months or so. It is therefore a feat of memory for those not intimately associated with the fixing of fares to keep abreast of the current situation. The alterations made by Order of the Transport Tribunal dated June 14, 1961 (the text of which was published last week by H.M. Stationery Office) stabilise the law for the time being, and enable the present position to be summarised. The Government proposals for the future structure, working, and financial reorganisation of the nationalised transport undertakings (see *The Railway Gazette* of December 30, 1960, p. 777) include commercial freedom whereby the railways would be released from statutory control over charges, except for fares in the London Passenger Transport Area, where London Transport and British Railways are regarded as having a virtual monopoly of public passenger transport. Such a change would reduce substantially the functions of the Transport Tribunal, but this is only a future possibility, as it is a feature of the proposals that cannot precede legislative sanction.

The Transport Tribunal was established under the Railways Act, 1921, as the Railway Rates Tribunal, and was renamed by the Transport Act, 1947. It is a Court of Law with jurisdiction, *inter alia*, over rates and charges for railway, canal, and port facilities, road passenger charges, and ancillary matters. Passenger fares on British Railways and all London Transport fares must be fixed within the ambit of a "charges scheme," and, in an era of rising costs, the time-lag between the need for increases and the issue of the requisite sanction has acted to the serious detriment of railway revenues. With the object of raising the headroom, to allow fares to be raised when necessary, the British Transport Commission submitted a draft scheme on September 1, 1958, which emerged on July 8, 1959, as the British Transport Commission (Passenger) Charges Scheme, 1959, after the original draft had been amended in respect of maximum season ticket charges. This scheme is still the basic authority for passenger charges, with maximum ordinary single fares of 4½d. a mile first class and 3d. a mile second class. These are higher figures than have yet been levied or are immediately envisaged, as the scheme is permissive and not mandatory. Ordinary second class fares were increased on November 1, 1959, from 2d. to 2¼d. a mile up to 200 miles, and thereafter tapered according to distance. On June 12, 1960, the basic figure was further increased by ¼d. to 2½d. a mile, with first class fares still at 50 per cent above second class. Immediately after the issue of the Alterations Order three weeks ago, but independently of its powers, as the original 1959 scheme had granted sufficient leeway, British Railways announced an increase of another ¼d. a mile (to 2¾d.) not later than September 1.

Temporary amendments to the 1959 scheme were made by Orders of April 14, 1960, and November 21, 1960, under section 23 (2) of the Transport Act, 1953. These ceased to have effect on June 30, as they are replaced by the new Alterations Order, which came into force on July 1. The alterations are the result of an application by the British Transport Commission last December, since when claims have been made for wage increases and shorter working hours—a further example of the time-lag. All but one of the requests have been granted in full. On London Transport services a new 2½-mile stage (8d.) has been inserted, and a flat addition is authorised of 1d. to all ordinary single fares above that figure. This increase is to be made on July 30. Another request was a 2d. increase on second class day return fares on the London lines of British Railways. This was granted and brings them into line with London Transport fares. Thirdly, the B.T.C. asked for a 5 per cent increase in season ticket charges on the London services of London Transport and British Railways. This was granted, but its introduction is delayed until January 1, 1962. A request for a 20 per cent increase in the ceiling of permissible season ticket rates outside London was refused. Instead, the Tribunal has allowed 5 per cent now, and another 5 per cent on January 1 next. The Alterations Order makes no mention of "early morning" tickets, successors to what, until September 1, 1952, were called "workmen's tickets." The statutory obligation to issue such tickets ceased on January 1, 1961. London Transport (which changed the title on October 1, 1950) has announced that "early morning" fares are to be increased on July 30, and will be withdrawn completely from January 1 next.

Indian Railways in 1959-60

WE have received from Mr. K. B. Mathur, Chairman of the Indian Railway Board, a copy of his report for the year ended March 31, 1960. It records that the gross earnings of all railways in India amounted to Rs.424·06 crores, or £318·045 million, Rs.31·73 crores (£23·8 million) more than in the previous year. Records were established in respect of passengers originating, passenger-miles, tons originating and ton-miles. Passenger earnings increased by Rs.8·92 crores or 7·59 per cent, and goods earnings by Rs.19·08 crores or 8·05 per cent over the 1958-59 figures.

Turning to Government Railways results, gross earnings totalled Rs.422·33 crores (excluding suspense) or £316·75 million. After meeting all charges, including depreciation amounting to Rs.45·85 crores, but excluding interest charges, the net 1959-60 working revenue amounted to Rs.74·55 crores against Rs.59·32 crores in the previous year. Of this sum, the statutory 4 per cent dividend on capital invested out of general revenues in non-strategic lines was Rs.54·43 crores and was duly paid. The surplus therefore was Rs.20·12 crores (£15·09 million) as compared with Rs.8·93 crores in 1958-59, an increase of Rs.11·19 crores (£8·39 million).

Reverting to the operation of all railways in India, the following are some of the principal results during the years ended March 31, 1959, and 1960:—

	1958-59	1959-60	Percentage variation
Passengers originating (millions)	1,440·9	1,534·0	+6·47
Passenger-miles (millions)	42,496·8	46,303·5	+8·96
Passenger earnings (Rs., crores)	117·58	126·50	+7·59
Average passenger journey (miles)	29·5	30·2	+2·37
Freight tons carried (millions)	136·6	145·5	+6·53
Net ton-miles (millions)	46,809	50,191	+7·23
Goods earnings (Rs., crores)	237·04	256·12	+8·05
Average miles a ton of goods was carried ...	342·8	345·0	+0·64

Continued attention was paid toward increasing operational efficiency, rehabilitation of depleted assets, modernisation and self-sufficiency. In the latter connection Chittaranjan Locomotive Works produced 104 "W.G." and nine "W.T." locomotives, bringing up the total produced between November, 1950, when the works were opened, and March 31, 1960, to 1,006. Also during the year, 448 coach shells were turned out at the Integral Coach Factory at Perambur, making a total of 1,150 since production began in October, 1955.

Altogether, 320 locomotives, 1,769 coaching units, and 9,917 wagons, in terms of four-wheelers, were received and placed in traffic during the year. On the civil engineering side, 910 miles of broad-gauge rails were renewed and 975 miles of sleepers and, on the metre-gauge system, 956 and 944 miles of rails and sleepers respectively. On the Brahmaputra bridge seven

main piers and one shore pier were completed. The estimated cost of this bridge was £7·41 million. Also, some 77 per cent of the new £1·45 million Gandak double-line metre-gauge bridge was completed.

The progress of electrification during the year under review included completion of the Howrah-Burdwan and Sheoraphuli-Tarakeshwar sections on the d.c. system. Work was also well in hand between Asansol and Gaya and on numerous branch lines in the coalfields area of the Eastern Railway. On the South Eastern Railway work on the Adra-Chandil-Sini-Tatanajar group of lines was also progressing satisfactorily, as was that on the Rajkharswan-Rourkela section of the Nagpur main line. During the year 165 miles of new railway were constructed.

Indian Railways received loans of Rs.23·81 crores (about £18 million) from the World Bank, and two others of Rs.19·04 (£14·28 million) and Rs.16·66 crores (about £12·5 million) from the United States of America Development Loan Fund. Other external assistance was received under the Colombo Plan from Australia, Canada and the U.S.A.

In the concluding portion of the general report, the question of amenities for passengers is referred to. Included was the decision to provide, free of extra charge, sleeping accommodation for third-class passengers travelling 500 miles or more. A new design of sleeping car providing equal seating and sleeping capacity was evolved. The 5-ft. 6-in. gauge vehicles accommodate 75 and the metre-gauge 64. Orders were placed for 200 of these cars.

The following were the financial results of working Government-owned and Government-worked company- and district-board-owned lines for 1959-60, with figures in brackets for 1958-59: Net Government capital-at-charge: Rs.1,432·28 crores (Rs.1,356.56 crores); gross receipts: Rs.422·34 crores (Rs.390·21 crores); working expenses, including payment to worked lines, suspense, and appropriation to Depreciation Reserve Fund: Rs.334·62 crores (Rs.321·44 crores); net traffic receipts: Rs.87·71 crores (Rs.68·77 crores); net miscellaneous expenditure: Rs.13·51 crores (Rs.9·45 crores); net revenue receipts: Rs.74·56 crores (Rs.59·32 crores); dividend to general revenues: Rs.54·43 crores (Rs.50·39 crores); net gain to Government: Rs.20·13 crores (Rs.8·93 crores).

In addition to the introduction of "crack" express goods trains, the loads of diesel-hauled mineral trains on heavily-graded broad-gauge lines then averaged about 3,200 tons (with two diesel units) on the South Eastern Railway. Tests also showed that loads up to 7,000 tons could be worked satisfactorily with three or four diesels, with certain improvements in the vacuum brake installed. Vacuum-braked goods-train working was also extended on the metre-gauge system. Goods train speeds averaged 5·2 per cent faster and loads 3·28 per cent heavier than in the previous year.

The route-mileage of all Indian railways on March 31, 1960, was 35,213, of which only 445 miles were not Government-owned. Altogether, 164·90 miles were opened during the year, 63·04 miles being part of the Khandwa-Hingoli metre-gauge link, and 42·04 miles of the Chandrapura-Hatia (Ranchi) line. Meanwhile, 750 miles were under construction or sanctioned. The two longest sections were the Northern Railway Robertsganj-Garhwa Road chord line to by-pass Moghalsarai, 101 miles, and Sambalpur-Titilagarh (South Eastern Railway), 114 miles, to carry iron ore destined for Japan *via* Vizagapatam. The conversion of 127 miles of metre to broad gauge was also sanctioned, as also was the doubling of 106 miles.

The Mokameh Ganges bridge was opened for passenger traffic on May 1, 1959, and is now named Rajendrapul (Rajendra bridge) after the Indian President who laid its foundation. Work on the Brahmaputra River bridge was proceeding well, about 30 per cent being completed.

During 1959-60, orders were placed for 126 steam and 17 electric broad-gauge locomotives, seven of the latter from Japan. The other 10 electrics and 90 "WG" and 36 "WP" steam locomotives were ordered from Chittaranjan. Meanwhile, 188 broad-, 120 metre-, and six narrow-gauge locomotives were placed in service. Also during the year 828 units of coaching stock were ordered, 372 integral light-weight coaches from the Perambur Integral Coach Factory, 285 all-steel from the Hindustan Aircraft works at Bangalore, and 171 all-steel motor and parcel vans from wagon-building firms. Moreover, 1,041 broad-, 525 metre-, and 49 narrow-gauge coaching vehicles went into service. Also, 6,252, 48, and 1,364 wagons (in terms of four-wheelers) respectively for those gauges were ordered, and 3,206, 299, and 21 were placed in traffic.

At the end of the year, 146 broad-, 27 metre-, and eight narrow-gauge diesel locomotives were running, 100 of the former on the Eastern and South Eastern Railways. Of the 100 a.c. electric locomotives on order from a European group, 19 were delivered during the year. The agreement between the North British Locomotive Co. Ltd. and the Chittaranjan Locomotive Works was renewed in December, 1959, for a further period of five years. It provided for assistance in the building of the mechanical parts of electric locomotives at Chittaranjan; the initial order was for 10 d.c. locomotives. Three Indian companies were given an educational order for 11,416 centre buffer-couplers, for progressive manufacture.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

DIESEL AND ELECTRIC TRACTION

June 18

SIR, Thank you for your comment on my letter in your issue of June 9. I agree that it is not easy to make a valid comparison between a hand-fired steam locomotive and the more modern types of power. Nevertheless, it was made clear from figures produced at the Modernisation Conference that the difference between the performance of a Class 8 steam locomotive and the most powerful diesel was slight at over 30 m.p.h., providing that the coal burner was stoker-fired. Taking the various objections to mechanical firing at their face value it is still perfectly clear that if oil had been used as an alternative and enough of the larger steam units converted, not only would passenger services have been at least as good as they are today, but the cost of obtaining that result would have been trifling and would have left enough capital to have made a real show with electrification.

"Locomotive engineers are generally agreed that the policy which is being pursued is correct. . . ." Would that by any chance include representatives from Germany, France, or Italy? Or would they share the writer's view that the said policy has been technically futile and economically disastrous?

Finally, and without wishing to rub salt in any wounds, would it be possible to find a more damning indictment of a policy than your reference to the new Western Region services?

Has the "Cornish Riviera" ever been slower in peacetime? What has happened to the 100-min. run of the "Bristolian," now taking 119 min.? Even the Pullmans are to take 115 min. On the other hand, we are assured that many point-to-point timings are to be at over 60 m.p.h. What has happened to the 75-m.p.h. schedules which we were assured would be the rule under the Modernisation Plan?

Is it significant that the only area where the not very exciting

operation is to remain almost unchanged is on the largely steam-worked Birmingham route?

What a pity that this dreary recital of recession should appear on the same page as a reference to the new Swiss Summer service with the usual monotonous Continental record of acceleration.

Yours faithfully,

L. IRVINE-BROWN

Ivydene, Tilston,
Malpas, Cheshire

RUBBER SUSPENSION

June 24

SIR, Mr. Sheppard's letter in your issue of June 2, 1961, disagrees with the criticism of rubber suspension contained in my article (" Obtaining a smooth-running bogie ") and cites a main-line coach carried entirely on Metalastik units,

The point intended by the article was that rubber springs are not suitable for a bogie incorporating the anti-hunting features and very soft suspension essential for a really smooth ride. At least 8-in. static deflection is needed adequately to cushion vertical movements, but Mr. Sheppard's units have only 5½ in. and also appear to be insufficiently soft laterally.

The bolster must also be rigidly connected to the bogie in the longitudinal (along the track) direction if rotational hunting is to be consistently avoided, but it appears impossible for units of the type illustrated to combine sufficient rigidity in the longitudinal direction with softness in the vertical and lateral directions. Mr. Sheppard's remark about " an almost complete absence of longitudinal vibration " suggests that this longitudinal rigidity has had to be compromised to such an extent that his suspension units are spongy enough to absorb these vibrations. If so, they cannot prevent hunting, and it should not be claimed that these rubber springs " do not need the usual bolster guidance system."

Doubtless, the rubber suspension shows a saving in weight, cost, and number of parts when compared with a British Railways standard bogie, but it must be understood that the latter has the needless complication of double bolsters referred to in the article. The suspension proposed therein is of less than half the weight and complication, and its riding qualities could only be matched by a rubber suspension of appreciably greater size and complication than the one shown in the aforesaid letter.

Mr. Sheppard may rest assured that a bogie with all-rubber suspension would be extremely welcome provided that it performs at least as well as the best possible version of the conventional type and costs less to build and maintain.

Yours faithfully,

YOUR CONTRIBUTOR

London, S.W.1

RAILWAYS INTO ROADS

June 26

SIR, In your issue of June 2, Mr. A. W. T. Daniel referred to the use which is made of wagons as temporary storage units. This is not a facility peculiar to railways, for road semi-trailers can be used for the same purpose. They are comparable in price with railway wagons and, when used as storage units, this does not involve idle time for either associated tractive units or drivers.

Although railways, with their precisely-guided vehicles, may appear to offer exceptional possibilities for the improvement of staff productivity through the application of fully or semi-automated processes, the new equipment so far introduced under modernisation has done comparatively little to improve the railways' financial position. This is mainly because the equipment is usually complex in design, with production on a small scale, leading to very high capital costs and these, coupled unfortunately with an often poor usage, have raised additional burdens of interest, depreciation, and maintenance charges largely nullifying the direct operating savings achieved.

A considerable improvement in the productivity of labour employed in long-distance road freight transport—the railways' most serious threat—would result from the extension of the motorway system. Prototype high-speed vehicles, such as the Norde 262 h.p. 68 m.p.h. 24-ton articulated lorry, are already in service, which will quite shortly render it possible for a driver to make the journey from Lancashire to North London and back in a single turn of duty, and for double-shifted vehicles to make the round trip twice a day. Very many more net ton-miles will be obtained each crew-hour and without the disadvantages to the operator of additional capital investment, because the higher daily mileages attainable by vehicles may well enable the size of fleets to be reduced.

Railway conversion could further this improvement in staff productivity, not only by enabling such comparatively fast-moving vehicles to operate over a dense network of routes linking almost every town and village, but by enabling their carrying capacity to be increased. Since access to conventional motorways can normally only be gained by way of all-purpose roads, there is likely to be limited scope in this small country for the operation over motorways of units much larger than those customary today, such, for example, as the 98 ft. long 53-ton combinations permitted over the New York Thruway and Massachusetts Turnpike.

Railways usually pass through the centres of industrial activity on wide formations so that the motor roads obtained by conversion might often have their through traffic lanes flanked in these areas by segregated slow-speed collection and distribution lanes. These would allow simple and direct access to be given to adjacent industrial premises, in much the same way as private sidings do now, and so permit high-capacity units to operate between many factories, mines, and docks, for example, without their having to pass over any part of the existing highway system.

Yours faithfully,

" BENBOW "

129, Sunnybank Road,
Potters Bar, Middlesex

June 29

SIR, For the information of Mr. Watkinson of Harrogate; a train of 12 Southern type suburban coaches seats 1,092 passengers in an excursion train. In commuting service ten is the maximum, equal to about 900 seats plus numerous standees. Normal headway on a main-line single track is 120 sec., but it can, and sometimes is, reduced in the rush hour. On the Great Eastern Line, headway is 90 sec. for an ordinary train following an express, and this is also the headway of trains on the District Line of London Transport. The movements are automatically signalled.

Obviously, what we need is not conversion of railways but more railways, and it is interesting to notice that in the much-motored United States, traffic congestion is to be eased by laying electric lines on the medial strips of the Chicago city expressways. H. G. Wells thought of that in 1905 (" A Modern Utopia ").

For a lollipop, take peppermint in one cheek and cloves in the other, as follows: —

" There would be no occasion to widen the formation . . . the Railway Conversion League has not varied its views on that point."—Brig. T. I. Lloyd in *The Railway Gazette*, June 9, 1961.

" The overall capacity of the converted railway system would, of course, depend on the nature of the conversion (amount of widening, etc.)"—M. J. Douglass; Clause 9 of the R.C.L. *Memorandum* to the Stedeford Special Advisory Group.

Yours faithfully,

C. HAMILTON ELLIS

Southesk, Mannings Heath,
Horsham, Sussex

The Scrap Heap

Brief encounter

A Harwell scientist travelling from Paddington mislaid his briefcase, causing considerable concern to himself and to his fellow passengers. When it was recovered from under a seat he opened it and took out, not secret papers, but sandwiches.—*From "The Evening Standard."*

50 years ago

The Great Central Railway offers an attractive day tour through Shakespeare's country, embracing Stratford-on-Avon, Warwick, Kenilworth and Leamington. The tour covers 196 miles of rail travel and a 33-mile motor drive in less than 9 hr. The inclusive fare is only 11s. 6d.— *From "The Railway Gazette," July 7, 1911.*

Making railway catering pay

Rugged courtesy in the Mid West was shown by the story of a Victorian English lady travelling on an American transcontinental train. In pre-dining car days, catering contractors at refreshment stops were apt to serve food so hot that much of it was left for the next customer. The English lady, suffering from this, was invited to take the coffee of a Mid West gallant, with the assurance that it was "already saucered and blowed !"

Restoration

The oldest locomotive on the Bluebell Line, the Sussex branch line now run by enthusiasts, has been restored to its original livery. The *Stepney*, built in 1875 at Brighton for the East London line from New Cross Gate to Whitechapel, is now resplendent in the yellow Stroudley livery. To achieve the desired result considerable research was necessary and visits to Brighton Art Gallery and the British Transport Museum at Clapham.

Baggage check

Elderly ladies travelling on the French railways are compelled to rely on Gallic gallantry to get their luggage off the train. Porters are not allowed to take suitcases off trains although they may place passengers' luggage in compartments when they are joining trains. This has been a constant source of irritation to passengers for some time.

Any union card?

The President of the Canadian National Railways, Mr. Donald Gordon, always carries a pocket screwdriver. When he travels on the C.N.R. system he uses it to tighten up loose pieces of equipment which may be causing squeaks. He considers that a lot of improvement can be made by the use of a little ingenuity.

Commonwealth railway stamps

Some parts of the Commonwealth have, on occasions in the past, displayed on their stamps unusual subjects of railway interest. The illustration shows two such stamps. One from Fiji has for its subject one of the 40 0-6-0 locomotives which haul sugar trains along the 300 miles of 2 ft. gauge serving the plantations on Viti Levu. The other from Malaya depicts the "Golden Blowpipe"

Commonwealth Railway Stamps

the crack air-conditioned jungle express from Gemas Junction to Tumpat, drawn double-headed by a pair of "O" class 4-6-2 locomotives.

Rivercraft

An old railway carriage mounted on a barge has been moored on the Thames at Old Windsor. Its presence has occasioned considerable indignation in the locality where it is described as an "eye-sore that is spoiling the amenities of the village."

Spot for spotters

On July 2 at Waterloo Station the Royal Observer Corps presented dual plaques, in the form of replicas of their long-service medal ribbon, to the Southern Region's "Battle of Britain" class locomotive No. 34050, which carries its name. These plaques will be placed on each side of the cab in recognition of the engine's 12 years' service. Following the ceremony the engine hauled a special train-load of 500 observers and their families to Bournemouth for the day. On return the driver and fireman were presented with sets of silver R.O.C.-crested teaspoons.

Commuter's nightmare

I know a man, who frequently asserts
We should admit, however much it hurts,
That goods and parcels, passengers and mails,
Must go much better if deprived of rails.

"Pull up confining tracks ! Lay concrete down,
And drive thereon your Jaguar to town !
Let complex signalling be swept away !
Warning devices, too, have had their day,
While twenty buses easily contain
The passengers from one rejected train;
And eighty lorries, each with man and mate,
Will move a trainload of our precious freight."

I dreamed. And so it was. At Fenchurch Street
I saw a vision for a Dante meet.
The London, Tilbury and Southend commuters
Were coming in by buses, cars, and scooters—
Or should have been—but all had ceased to function
A long, long way beyond Gas Fact'ry Junction;
And, choking with the stench of hot exhaust,
In torment toiled that legion of the lost !

Far worse it was upon the G.E. Line
(The Liverpool Street clock was just at nine).
A solid jam of motors, still as death,
Crowded the route as far as Chadwell Heath;
And cutting-in, 'twixt omnibus and platform,
A Zodiac had just assumed a flat form.
At Temple Mills was last month's freight, bogged down.
Somehow the passengers must get to town!

Prince ! The Olympians had found it jolly
From Higher Spheres to contemplate man's folly,
Till Hera yawned: "That traffic needs a jolt !
Dear Daddy Zeus! Chuck a thunderbolt!"

C. HAMILTON ELLIS

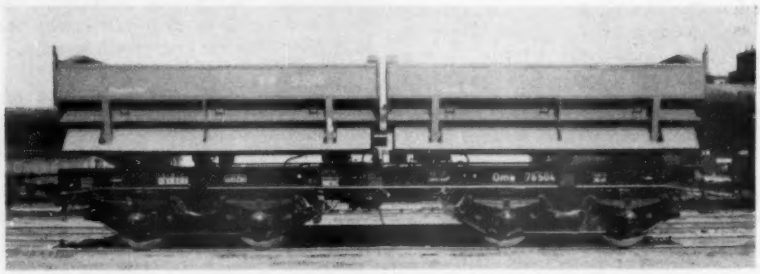
OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

FINLAND

Experimental ore wagons

At the end of April the last of a series of five experimental bogie ore wagons was completed in a Finnish State Railways workshop. The wagons are being tried out between Outokumpu and Kotka. Each is equipped with twin electro-hydraulic tipping hoppers with a combined capacity of 13 cu. m. The hoppers can be tipped either separately or together. The length of the wagon over buffers is 38 ft., tare weight is 30 tons, and capacity 50 tons.



Electro-hydraulic twin-tipping-hopper wagons on the Finnish State Railways

INDIA

Calcutta Port Commission Railway

The Calcutta Port Commission spent over £250,000 during the Second Five-Year Plan period in the purchase of nine Canadian diesel locomotives with funds made available by the World Bank.

Increasing capacity of N.E.F.R.

Important measures are being taken, as well as the bridging of the Brahmaputra, to increase the line capacity between Katihar and Ganhati. The construction of the Brahmaputra Bridge has been described in detail in *The Railway Gazette*, but recent reports state that eight of the 11 piers have been completed ready to receive the girders. Fabricated parts of the girders are arriving at site and the bridge should be ready for opening in about 13 months' time.

AUSTRALIA

Sleeping and sleeper-lounge cars

The Commonwealth Railways administration has placed in service some new second-class air-conditioned sleeping cars and sleeper-lounge cars. The sleepers are two-berth roomette, 36-passenger cars, 83 ft. 2 in. in length, fitted with every modern convenience. Sponge-rubber mattresses and seat-cushions, and separate wardrobe for each passenger. The sleeper-lounge cars have 31-ft. lounge compartments and 20 sleeping berths. Internal doors have opening mechanisms controlled by the pressure of the foot on a mat.

Mr. C. G. C. Wayne, Commissioner of Railways, W.A.G.R., with officers of the system on the occasion of the inauguration of "The Albany Progress"

QUEENSLAND

Mount Isa rehabilitation

Track re-laying between Richmond and Duchess on the Mount Isa rehabilitation project is being accelerated to a mile a day. The work is being carried out by modern methods, ballasting by lifting the track and filling beneath it. Fishplates are mechanically unbolted and removed, spikes are pulled, and rails on one side are removed and an adzing machine on the other rail cuts the exposed sleeper seatings. The new rails are bolted together on the track shoulder and swung by a laying machine into position. All other operations are similarly mechanical.

WESTERN AUSTRALIA

New train for Western Australia

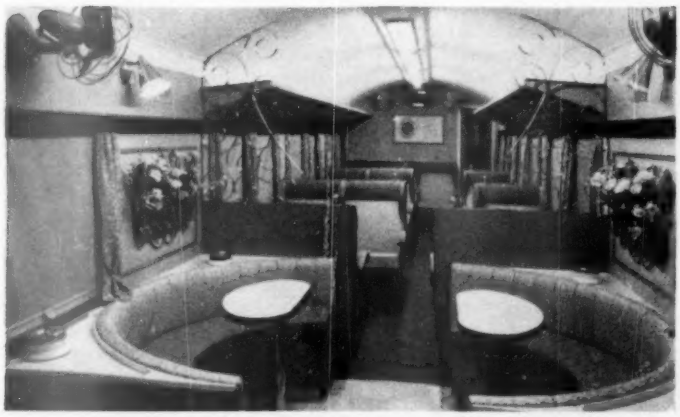
Illustrated on page 9 is "The Albany Progress," a train inaugurated on May 31 this year, on the Western Australian Government Railways by Mr. C. G. C. Wayne, Railways Commissioner. The new train is part of an overall improvement plan which also includes the provision of *de luxe* buses and fast freight trains running two nights a week at passenger-train speeds. Mr. Wayne presented the Mayor and people of Albany with a plaque commemorating the inauguration of "The Albany Progress." This took place 72 years after the official opening of the Great Southern Railway, on May 31, 1889.

"The Albany Progress" in the Darling Ranges near Perth

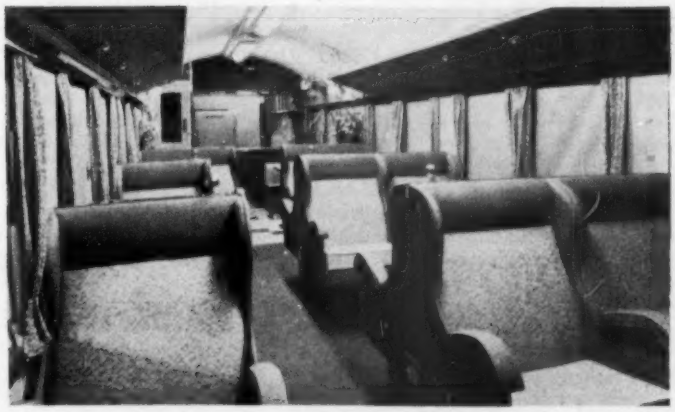
"THE ALBANY PROGRESS"

A new train for the Western Australian Government Railways

The buffet at the end of the lounge section



The lounge as viewed from the buffet



The lounge, showing contour type seating

RE-SIGNALLING AT NEWPORT, Western Region

Stage 1 of a large project necessitated by construction of local steelworks

THE construction of Spencer Steelworks at Llanwern, between Severn Tunnel Junction and Newport has necessitated a rearrangement of the layout between these two places. From Severn Tunnel Junction to Magor, the existing parallel running (Up, Up, Down, Down) on the four tracks remains to be compatible with the existing Up and Down marshalling yards on each side of the main line at Severn Tunnel Junction. Between Magor and Llanwern, the Up relief line has now been carried over both main lines by a fly-over, so that from this point westward, both Up and Down relief lines are on the south side of the main lines. Double-line junctions provide access to and from the relief lines at each end of the steelworks.

This arrangement for alternate running (Up, Down, Up, Down) is continued through Newport Station with the result that through platforms 1, 2, and 5 on the north side of the station become the principal passenger platforms, with platform 6 on the south side as a relief. Freight traffic passes through the station on the relief lines, which are middle roads not served by platforms.

This arrangement will greatly facilitate working. Access to the docks beyond the tunnels at the west end of the station is by connections on the south side of the line. In particular, trains can be run between the docks and the steelworks without crossing the main lines or otherwise interfering with passenger traffic.

A further improvement is that platforms 1, 2, and 5 have been re-signalled to allow both-way working. This will be extended on the main (or passenger) lines through the tunnels to Gaer Junction at their western end.

"Entrance-exit" route-setting panel

A comprehensive re-signalling scheme covering the Newport area is being installed. When this is complete, the territory will be controlled from a signalbox equipped with a route-setting "entrance-exit" panel. The box will be at the east end of the station on the south side of the line and will control 67 track-miles of line with 396 routes, extending from Magor (exclusive) in the east to St. Brides (inclusive) in the west. Between these limits lie:—

(1) The western connections to the new steelworks and main-line connections at East Usk Junction;
(2) A triangle junction giving access from both east and west to the main lines to Hereford and Shrewsbury. The signalbox will also control the Hereford line for some distance beyond the apex of the triangle;
(3) Newport Station;
(4) Gaer Junction, where Eastern and Western Valley lines diverge to the north;
(5) All connections to the docks, carriage sheds and sidings, and to the Motive Power Depot, as well as the spur from the Valley lines, giving these a direct connection with Cardiff. When the scheme is complete, 15 signalboxes will have been displaced.

Over the whole of this territory, main lines are numbered as follow:—

Up main	1
Down main	2
Up relief	3
Down relief	4

Additional numbers are used for other lines when necessary. All the signals in the scheme are being identified by three-figure numbers, the first figure of which shows the line to which signal in question applies.

Six stages

The scheme is being carried out in six stages, and is due for completion by the end of 1962. The first stage was brought in use on April 16 last, in readiness for the opening of the steelworks. It involved the closing of five signalboxes and the re-signalling of 30 track-miles of line. The final changeover during the week-end of April 16 was carried through very smoothly and expeditiously. This was the result of careful and detailed advance planning, which included among other points the installation of a temporary automatic telephone exchange, provided exclusively for the occupation and serving more than 20 extensions equipped at Occupation Headquarters and various control centres on site.

Stage I involved the following three new installations:—

(1) At Magor, at the east end of the territory, the existing 47-lever mechanical frame has been supplemented by a route-setting "entrance-exit" panel, controlling the eastern double-line junction from the Up and Down relief lines (lines 3 and 4) into the new steelworks. The panel also releases a ground frame controlling Bishton Level Crossing. This adjoins the junction to the steelworks.

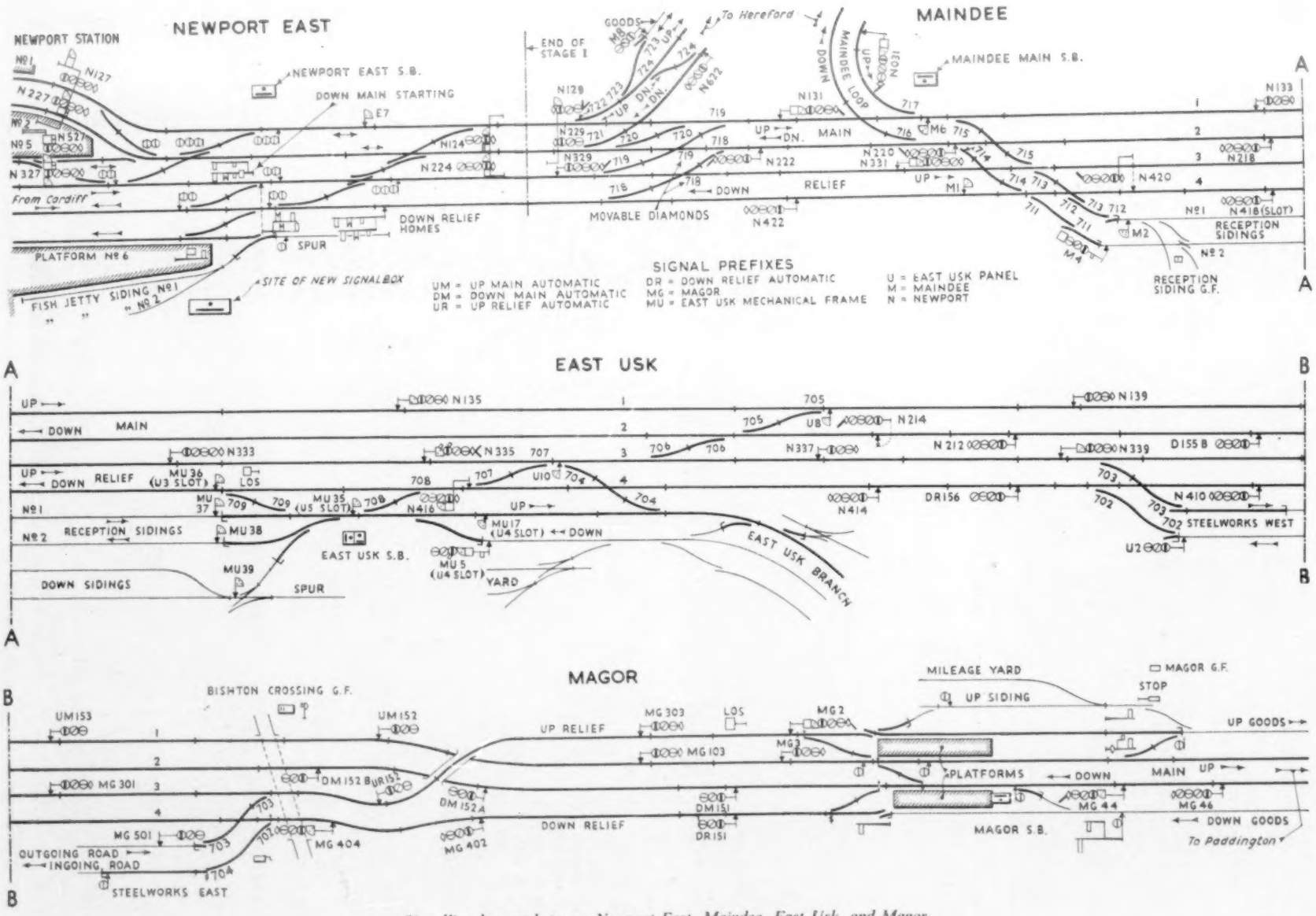
Magor will remain as a "fringe" box after the Newport panel box is opened, but will be abolished when the continuous signalling centralisation scheme, with the control panel at Severn Tunnel Junction, is brought in use.

(2) At East Usk Junction, where the East Usk branch joins the main lines, there is a new signalbox with a mechanical frame of 39 levers controlling the branch and various connections to sidings. In the under part of this box is a permanent relay room, and in a separate room at one end of the structure a temporary route-setting panel controls the signalling on the four main lines and the western double line junction from the steelworks to the relief lines.
(3) At Maindee there is a new permanent relay room, and in an adjoining room in the same building a temporary route-setting panel which controls the junctions at each end of the base of the triangle formed by the Hereford lines.

The mechanical frame at East Usk Junction is permanent, but the East Usk and Maindee panels will be removed when the central signalbox at Newport is opened. The relay rooms will remain as satellite installations, remotely controlled from the new signalbox over non-safety circuits using Post Office type relays. The circuits between box and satellite relay rooms will be for route "calling" and indication purposes only. All interlocking, track circuit, and other safety controls will be accomplished through orthodox equipment local to the relay rooms.

Stage-work alterations

Extensive stage-work alterations have been required at Newport East signalbox to provide for working between this box and the temporary panel at Maindee. This is additionally complicated by the introduction of both-way signalling on lines 1 and 2, with acceptance controls between these two points and onward through the station. The Newport East signalling shown on the diagram is as it



Signalling lay-out between Newport East, Maindee, East Usk, and Magor

exists at present, and not as it will be when the whole comprehensive scheme is complete.

The existing Newport installation is of the Ferreira-Insell route-setting pattern. Installed in 1927, it makes use of miniature lever frames with four-position lever quadrants.

Conditions are extremely cramped in East box, both in the relay room and on the operating floor. For this reason, the relays and other apparatus associated with the stage work have been equipped on two relay racks installed in the relay room of the new central box (the structure of which has been completed with interconnecting cables to the existing East box relay room.

Stage 1 comprises 50 controlled and 20 automatic multiple-aspect signals. The latter are between Magor and East Usk. These signals, both controlled and automatic, are three- or four-aspect, as required. They are provided with junction indicators or theatre-type route indicators. There are 11 position-light shunt signals, some of which are ground signals, and others subsidiary aspects of the main running signals. All give the standard indications—no lights, or a red and white light set horizontally, when " On," and two white lights at an angle of 45 deg. when " Off."

Running signals

All running signals are automatically restored to danger by the occupation of track circuits in advance but, in certain cases, where the first track-circuit joint in advance of a signal is very close, that signal remains " Off " until the second track-circuit ahead is occupied. Ground shunt signals as a rule remain " Off " until the track circuit ahead of them has been both occupied and cleared.

Where necessary, the appearance of the clear aspect of a running signal is delayed until the berth track-circuit to the signal is occupied. At some signals a further time interval is enforced. Thus a delayed aspect is given for turnouts where a speed reduction is called for. In certain cases, a more severely-delayed yellow aspect is given when the track ahead of the signal is clear but the overlap beyond the next signal is fouled.

All points are operated electrically. There are 46 point machines in the area covered by Stage I. They are of the Westinghouse M.3 type.

Stage I includes 150 track circuits, all of the a.c. capacitive type.

As already stated, temporary panels have been installed at East Usk and Maindee. These are set vertically in the wall of each control room, and are of the mosaic or domino type, as already installed at Birmingham, Snow Hill, and Plymouth*; the same type will be used in Newport signalbox. This type has the advantage that the panel is built up in small units, each of which can be easily removed, whether for adjustment or repair, or in the event of an alteration in the layout.

Route-setting

All signal profiles and track circuits are shown on the diagram. Opposite each signal there is a rotary " entrance " switch and immediately in rear of the next signal in advance there is an " exit " press button. To set up a route from one signal to another, the " entrance " switch is rotated and the " exit " button is pressed.

The track lines on the diagram each contain a series of short rectangular apertures to show the state of each section of the track. There is a white dividing line at the end of each track circuit, and a black dot on this line where applicable marks the end of an overlap. Normally, these apertures are not illuminated. When a route is set up, the apertures defining the position of the points in that route flash, if and so long as the points are out of correspondence. Once all the points are locked and detected, white lights appear along the whole of the route. The repeater in the signal profile changes from red to green, as soon as the signal displays a proceed aspect.

When the train passes the signal and occupies the track-circuits in advance, the lights in the relevant panel track-lines change from white to red and are extinguished as the train clears each section, provided the entrance switch has been restored to normal, showing that the sectional releases to the route-locking have taken effect.

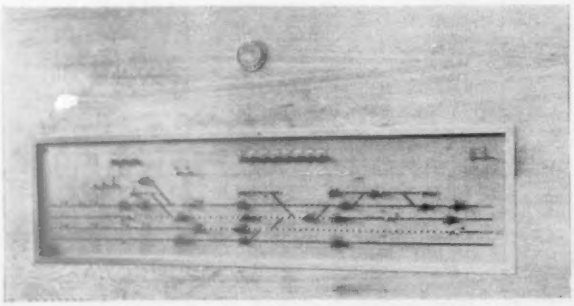
As regards the overlap beyond the signal next in advance of the signal in question, the setting-up of the route between these two signals causes indications to appear on the diagram in the track-line apertures defining the setting of all facing points in the overlap. In general, such facing points are not locked in either position, so long as the signal immediately in rear of them is " on," and provided that the overlap applicable to the position to which those points may be altered is clear. But when facing points are so close to the signal protecting them that a train overrunning that signal could reach them while they were moving, those points are locked as soon as the train occupies the track circuits to the rear of that signal, even although it is " on." This locking is subject to a time release sufficient to ensure that the train has come to a stand at the protecting signal.

If trailing points in the overlap are in a conflicting position, this is indicated when the route is set up by the lighting of the aperture in the track-line defining their position. Under these conditions, the signal concerned may exhibit only a delayed yellow aspect. If the points in question are in the correct position, they will be automatically locked in this position by the setting of the route, and the signal will immediately clear to the aspect dictated by track conditions. Once a signal has displayed a less restricted aspect than delayed yellow, all trailing points in the overlap beyond the next signal remain locked in the appropriate position.

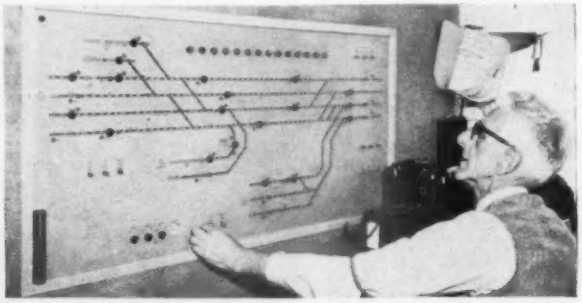
Additional white visual

The usual approach locking with appropriate time releases is in force for a train approaching any signal. An additional facility equipped on the Newport panels, not provided in previous installations, consists of a small white visual alongside the signal profile. This becomes illuminated when the signal concerned is approach-locked. This is in addition to the white route lights which remain illuminated under approach locking conditions, and is of assistance

*See *The Railway Gazette*, October 28 1960, and January 13, 1961



Temporary panel at East Usk Signalbox



Temporary panel at Maindee Signalbox

in indicating to the signalman from which direction, under two-way working, the approach locking has been applied.

Certain routes into sidings require a previous release from the shunter. This is indicated by a white light on the diagram. Indications are also provided opposite the special switches giving releases to ground frames. Where signals are slotted by adjacent boxes, the clearance of the slot is indicated on the diagram by the illumination of a rectangular arrow-headed aperture.

There are no block instruments in use on the main lines in the Stage I territory. Trains are described forward by single-stroke bell, but otherwise the signalmen work off the panel indications and controls. When Newport signalbox comes into operation, a standard Western Region four-character train-describer scheme will be provided.

Acceptance arrangements

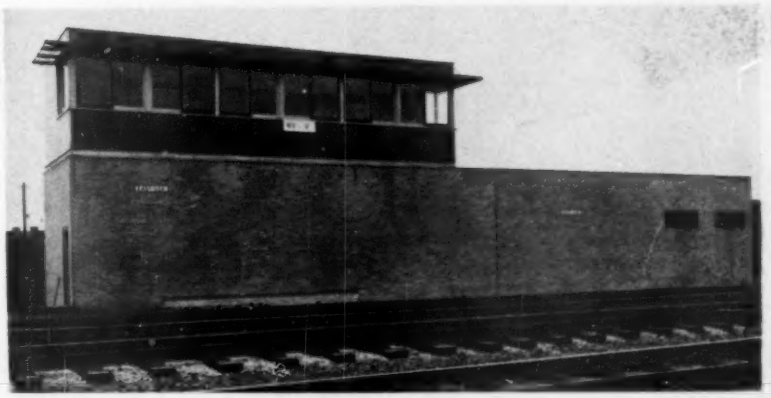
Special acceptance arrangements superseding the previous manual block arrangements are in force between the Maindee temporary panel and the existing Newport East box. The acceptance controls for line 3 (Up) and line 4 (Down) allow unidirectional movements, while those for lines 1 and 2 permit both-ways working.

On the right side of the Maindee panel are, first, three indication lamps and buttons. These are for accepting trains from Newport East on lines 1, 2 and 3. To accept a train, the button for that line is pressed and, provided that conditions are correct for that movement, the lamp above the button comes on to show that the acceptance has been given. The acceptance is effective for one train only, and is cancelled automatically when the train has cleared the section. No acceptance can take effect unless all the track-circuits through the route are clear, the overlap is clear and correctly set, and, in the case of lines 1 and 2, all signals reading on and from the section between the two boxes are "On" and free of approach locking.

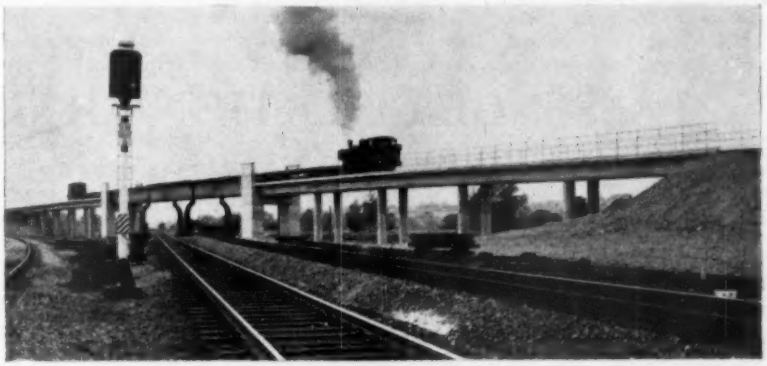
There are also three indication lamps for lines 1, 2, and 4. These light when a train has been accepted by Newport East. This acceptance simultaneously causes the relevant slot indicator on the diagram to light up.

Finally, there are three cancelling indication lamps and buttons. To cancel a train on line 1 or 2, both the Maindee and Newport East signalmen must simultaneously depress their buttons and hold them down until the cancelling lamp lights and the acceptance lamp is extinguished. Cancellation is effective only when all signals concerned are "On" and free of approach locking and the section track-circuits are clear.

To cancel a train on line 3 (for trains approaching Maindee) the Maindee signalman depresses his button for 1 min.



Exterior of East Usk mechanical signalbox



Fly-over at Bishton where the Up relief line crosses the main lines

After this period of time, his indication visual comes into operation, showing that cancellation is effective. A similar arrangement is provided in Newport East box for line 4.

Individual point switches are placed along the top of the panels. They normally lie in the central position, and are turned to the right to reverse the points and to the left to put them to normal. Each switch has three indication visuals. The centre lamp shows red when the points are locked either by the setting-up of routes involving them, by track- or route-locking, or when the individual point switch is turned to the right or left. The further two side lights indicate the position of the points, normal, or reverse as appropriate.

The panels also contain the usual push-buttons for release of remote hand-cranks, dimming switches, fault indicators, and pushbuttons for operating block bells to adjacent boxes.

East Usk panel

At East Usk panel, points 704, 708 and 709, which connect the main lines to the sidings, are operated by the panel signalman, but are subject to a release from the separate mechanical frame. The signalman at that frame must first reverse an interlocking lever (one for each set of points) in his frame, causing a white light to show above the relevant individual point switch on the panel. The points may then be operated either individually or by setting up a route through them. While they remain reversed, the mechanical interlocking lever is locked in the reverse position.

Signals leading between the sidings and the main lines are slotted in the normal way, with appropriate indications for each signalman.

These arrangements with the mechanical box will continue after Newport Signalbox is in use, with the relevant controls transferred to the latter from the temporary panel.

Plug-in relays

The relay rooms at Magor, East Usk, and Maindee, together with the new relay racks at Newport East, contain a total of 1,960 signalling-type "plug-in" relays, for the control of all "safety" circuits—interlocking, point operation and detection, signal operation, track circuits, approach-locking, etc. These are mainly of the miniature type, but the track relays, point detection relays, and some other relays are full-size. Route-calling and indication circuits between the panels and the relay rooms are "non-safety," and use Post Office relays mounted in units of five plug-in

Continued on page 20

Overbridge at Harlow Town Station

PASSENGER STATION DESIGN in the Eastern Region

Modernisation and the growth of new towns encourage application of contemporary design to passenger stations

THE passenger station is often the first part of a railway undertaking to make an impact on the traveller. It may also provide him with his first impression, good or bad, of a strange town. A well-designed station is therefore important both to the railway and to the local authority and, in some countries overseas, particularly on the Continent, this is recognised to the extent that local, provincial and even central government may contribute to the capital cost.

In Great Britain the railways usually have to meet the full expense, and such work as has been undertaken in recent years has been confined to restoration of war damage; reconstruction necessitated by major replanning of the permanent way, and expansion or new building to cater for traffic developments on a large scale, as with new towns.

The Eastern Region of British Railways has been fortunate in that electrification and other modernisation projects, together with the growth of the new towns situated to the north and north-east of London, have led to considerable activity in station reconstruction and new building. In the past ten years, war-damaged stations at Grays and Leytonstone have been completely reconstructed; stations have been built at Potters Bar and Hadley Wood in connection with the widening of the Great Northern main line; and electrification of the line between Liverpool Street and Bishops Stortford has necessitated new stations at Broxbourne and Harlow Town.

Booking hall at Harlow Town Station

Major reconstruction in progress

Work is in progress on major reconstruction schemes at Colchester and Barking and extensive alterations are taking place at a number of other stations in connection with electrification, particularly on the London, Tilbury & Southend line. Finally, plans are in preparation for the reconstruction of some of the larger stations in the Region, to be taken in hand when money is available.

The first essential in considering the layout of a station is to see that it is properly integrated with the transport plan for the area as a whole. This is particularly important in the case of new towns, where the type of "open" planning normally adopted tends to emphasise the role of the railway station

as an interchange point between local road traffic and longer distance rail services.

Adequate provision must be made for buses (in consultation with the local bus company), for car parks, taxi ranks, and cycle storage. The importance of car parks is most marked where the station is within easy commuting distance of London, but the growth of car ownership and improvements in passenger services are steadily increasing the range of daily business travel. Requirements for car parking are therefore studied separately for each station and, where land is available and circumstances warrant it, provision may be made for 500-1,000 cars.

The basic plan of the station is determined by the permanent way and signalling layout, which itself depends on the type and frequency of the services. Once these fundamental factors have been settled, planning of the station itself is based on a study of present and future flows of passengers, parcels and goods, and the design finally adopted is that which gives the best possible answer in terms of economy and efficiency in construction, maintenance, and working.

No attempt is made to impose a standard appearance; each station is considered in relation to its surroundings and to its required task. By the use of modern finishes and new materials such as pre-stressed concrete it is the aim to produce buildings, which not only will have a definite railway character but also be structurally sound and aesthetically pleasing.

Alike, yet different

Although the implementation of this policy has the result that no two stations are alike, most of the new designs have certain features in common. The latest examples have been designed on the principle that, as far as possible, flows of passengers and parcels traffic should be kept apart. In these stations, the overbridge or subway giving access to the platforms is built to a width sufficient to permit separate streams of passengers and parcels and may even be divided along its length to enforce this separation. The parcels route connects directly with the parcels lifts and parcels office without crossing normal passenger routes.

Uncluttered platforms

Nothing more than short awnings and shelters are provided on the platforms, except where cross-platform interchange is exceptionally heavy, as at Barking. To avoid duplication of public facilities, such as waiting rooms and toilets, these are concentrated on the overbridge or subway.

The concourse is the focal centre of the station; it is entered directly from the main approach road and gives access to the platforms. Ticket and enquiry offices, bookstalls, kiosks, timetables, departure indicators, and, if possible, the stationmaster's office, are planned either in the concourse or having direct access from it.

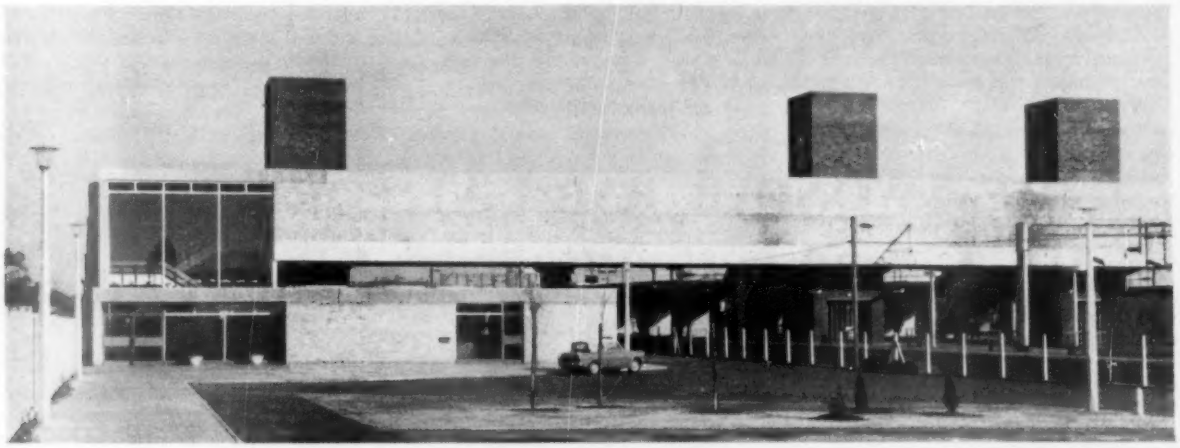
A single control point for ticket inspection and collection is established, where circumstances permit, between the concourse and the overbridge or subway, and research is being made into the possibility of designing a cheap and easily-produced standard ticket collector's box, incorporating lighting and heating.

Experiments are being made with press-button heating in waiting rooms, where they are not included in the general heating scheme. Special attention is paid to these rooms and the walls are often decorated with artists' paintings, lithographs and tiled murals to give a more personal atmosphere.

Special attention is devoted to the ticket office. A glass front is the most prominent feature, with "speak here" apertures designed by the Regional Architect, who is also responsible for the standardised metal equipment and furniture used. Mechanisation of ticket issue is normally adopted for the larger stations and the space required for the machines is an important factor in deciding the size and layout of the office.

Each ticket office has a special messing coupe incorporated in the plan, which also includes the enquiry counter and is, wherever possible (at the smaller stations), closely associated with the parcels office, so that all three offices can be run by the minimum staff on Sundays and during off-peak periods.

The materials used are carefully chosen to reduce maintenance; costly periodical re-painting is a thing of the past, and materials with surfaces which need painting, such as plastered walls and softwood, are used sparingly and only when no suitable alternative can be found. Instead, use is made of hard-wearing materials with easily-cleaned surfaces and a natural decorative finish, such as anodised aluminium, wrot timber finished with a clear lacquer (for interior use only), tiles and mosaics and plastics such as Formica.



South aspect of Broxbourne Station

Walls, except the interior walls of offices, are generally tiled or left with the exposed brickwork carefully pointed. Floors are normally tiled or covered with wood block or lino, specially rough non-slip materials being used on ramps and on the nosings of staircases.

Platform lighting

Lighting on the platforms is standardised, cold cathode tubular fittings incorporating the station name being generally employed, from a range which has been developed for the purpose by the Chief Mechanical & Electrical Engineer. Various forms of lighting are used inside the buildings, the choice of fittings being varied to suit the décor and purpose of the rooms concerned.

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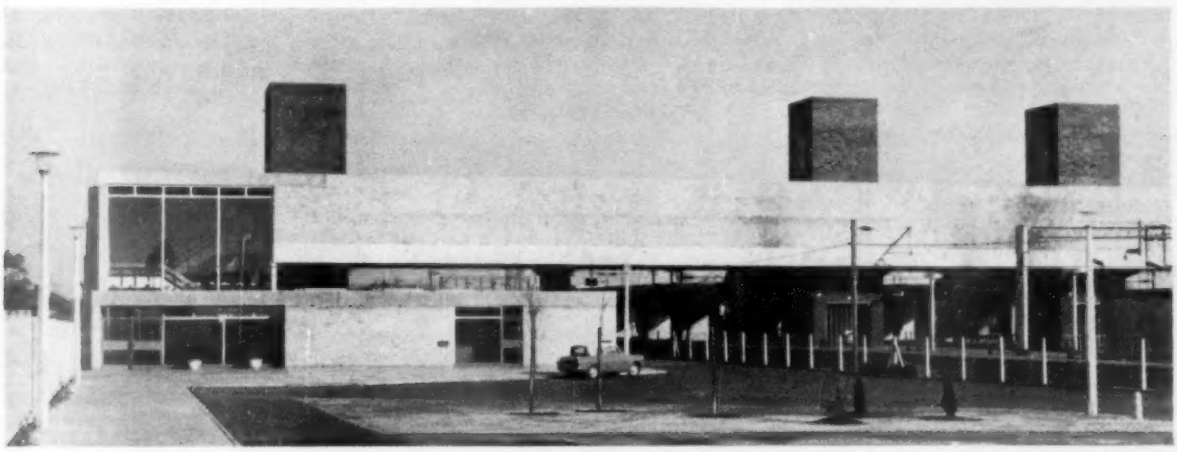


South aspect of Broxbourne Station

Booking hall and ticket office at Colchester.

displays and other advertising matter fit in with the general architectural treatment and that the standard nameboards and direction signs in the Regional colours are sited to the best advantage.

Although differing traffic and geographical requirements and the use of new techniques and materials make standardisation of design undesirable, the use of standard components is encouraged, and careful attention is paid to the design and appearance of even the smallest fittings. These features, together with lighting and signing, serve to give the new stations something of a family look, however different they may be in their basic design.

To produce within severe financial limitations a sound and pleasing station design, which will be a credit to the railway and an asset to the town which it serves, both now and in the future, provides a worth while challenge to the skill and ingenuity of an architect. The measures outlined in this article show how this challenge has been tackled in the Eastern Region.

THE "WONDER BAR" AT PORTRUSH, Ulster Transport Authority

New premises comprise lounge and bar proper, with direct access to Northern Counties Hotel

OPENED on June 22, the "Wonder Bar" at the Ulster Transport Authority's Northern Counties Hotel at Portrush has a front entrance enhanced by mosaic tiling on each side of a broad frame of natural timber ribbed in two shades, and gold wrought-iron railings and decorations.

Above the door is an illuminated name sign in red letters on white opal Perspex. The concave and convex faces make it easily legible from all directions.

"Wonder Bar" at Portrush, Ulster Transport Authority

An armour-plate glass door has large coloured plastic-covered discs to act as door pushes. A short flight of steps in the entrance porch, which is panelled in Limba wood, also has plastic-covered discs instead of orthodox handrails, and gives access to the lounge and to the corridor leading to the bar.

View of the Atlantic

The lounge has a large bay window giving an uninterrupted view of the Atlantic. The windows are draped with Moygashel curtains patterned in yellow, black and white. The floral carpet is pink. Walls are papered in multi-coloured continental designs. The longest wall—in white, yellow, grey and black—bears modern paintings and contains a fireplace of simple straight-cut design in black and white, and decorated with gold and white hand-painted tiles.

Seating comprises television and lounge-type armchairs, upholstered in grey, black, and blue moquette, and there are occasional round-top stools. The small square and G-plan "Long John"-type contemporary tables are of mahogany heat-resisting veneer.

The ceiling is papered in a green and white "splash" design, with modern hanging lights.

The full-length bar counter is of black, red, and white multicoloured Murano plastic. Fittings include refrigerated shelving, beer-cooling cabinet, and ice-making unit. The wall behind the counter is papered with broad stripes of green, pink and blue. The centrepiece of the bar is the large viewing panel surrounded by champagne-tinted plate glass. On this panel, at the pressure of a button, a succession of coloured scenic views appears.

Direct access to the "Wonder Bar" from the hotel is made through a glass, wood, and wrought-iron porch.

The design and construction of the bar and lounge was carried out by the Authority's Civil Engineering staff.

SIGNALLING DEVELOPMENTS on London Transport

Pushbutton control from Leicester Square extends scope of programme machines as far as East Finchley

A FURTHER stage in the modernisation of the signalling on London Transport's Northern Line came into effect during the night of June 24/25, when signalling at East Finchley was changed over to automatic control by programme machines and that at Archway came under the direct pushbutton control of Leicester Square supervision room.

Programming machines are installed to work the signalling (including points) at four places on the Northern Line: at Kennington, Euston, and Camden Town and, now, at East Finchley. Between these places, the signalling is automatic and has been for many years except that certain emergency cross-overs are worked from a local frame when necessary.

Scope of control

The distance from Kennington to Camden Town via Charing Cross is 4·29 miles and 6·08 miles via Bank. From Camden Town to East Finchley the distance is 3·88 miles. In a sense, therefore, the scope of programme machine working may be said to extend to 14·25 miles, but this is misleading. Programme machines control only the junctions in their immediate areas. With the London Transport automatic type of signalling no signalmen are needed except at junctions. In between, the trains signal themselves.

At both East Finchley and Archway, existing interlocking machines for some weeks have been controlled manually from temporary key panels. These panels have been taken out of commission and the signalboxes closed. Except for minor alterations, signalling installations on the ground have not been changed. The panel in the supervision room at Leicester Square has been modified to accommodate the additional pushbuttons for Archway signalling and pushbuttons and programme machine controls for East Finchley.

East Finchley

At East Finchley two programme machines have been provided. These control the signalling of southbound and northbound trains respectively through the junction area. These are " sequence " machines, one of which is normally provided for each converging or diverging junction. They work in conjunction with a third programme machine, arranged as a " time " machine, which acts as a controlling clock. The connections to the goods yard and reversing siding, with their associated signals, do not come under the control of the programme machines but goods trains are included in the programme rolls.

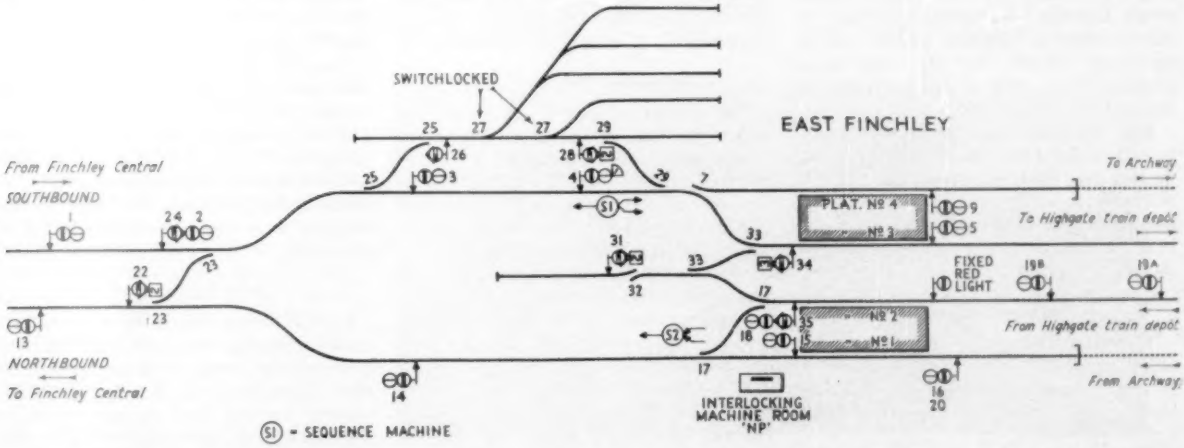
The appropriate programme machine transmits a warning—an intermittent low-pitched buzz—to the supervisor at Leicester Square when a goods train is due to arrive at East Finchley. Leicester Square then signals the train by pushbutton operation. The programme machine continues to step as the goods train proceeds on its scheduled path under pushbutton control; no special action other than actual operation of the pushbutton signalling controls is required in the supervision room.

Should a northbound goods train be delayed, the programme machine will automatically step to the next passenger train when that train is due to depart and has arrived from Archway. Should a southbound goods train be delayed, the receipt of a passenger train description from Finchley Central will automatically step the programme machine to the next service train. When the goods train does arrive it will be indicated at Leicester Square by the train description and can then be signalled by pushbutton in the usual way without affecting the programme machine.

Leicester Square

As already stated, the panel in the supervision room at Leicester Square has been modified and extended to accommodate the additional pushbuttons required. The illuminated track diagram has been extended to cover the additional area. The pushbuttons are similar to those already provided for the operation of the signalling at Kennington, Euston, and Camden Town, should circumstances make it necessary for the supervisor to take over control from the programme machines.

The pushbuttons for Archway, where there is a siding between the two running tracks north of the platform and a reversing crossover south of the station, will be used only when it is necessary to reverse a train. Normally, the signals at



Schematic layout of signalling control from Leicester Square to East Finchley on the Northern Line of London Transport

Archway will work automatically for through trains unless deliberately switched to pushbutton control by the supervisor at Leicester Square.

The panel at Leicester Square also contains train describer and point indications as well as two panels indicating the state of the programme machines at East Finchley. Previous Northern Line programme machine installations have included repeater programme machines in the control room which have followed those at the station, but repeaters are not provided for the two East Finchley machines.

Train number code

As with the recent programme machine installations on the District Line at Parsons Green and Putney Bridge, which are supervised from a room at Earls Court, arrangements have been made to display the number of the train being dealt with by each programme machine on the appropriate panel at Leicester Square. The train numbers are punched on the programme rolls in the form of a decimal binary code, the numbers 8 and 9 being omitted to reduce the numbers of columns of holes required and simplify the decoding apparatus. A range of eight holes enables the numbers from 1 to 377, except those incorporating the digits 8 or 9, to be used. It has been necessary to re-number all Northern Line trains to meet this latter requirement.

Panel illumination

When normal working by programme machine is in progress, the appropriate panels at Leicester Square carry an illuminated letter " P." When the junction is switched to " first-come-first-served " working, of which it is capable should the service for some reason depart too widely from the normal programme, a letter " F " is shown in red, and when pushbutton operation is in use a letter " B " is shown.

The controls of the East Finchley programme machine are not on the actual control panel, as with previous Northern Line installations, but on a desk unit which can be switched by pushbutton to operate either of the East Finchley sequence machines. An illuminated indicator shows which machine is linked with the desk unit at any time. Normally, the desk unit is not connected to either machine.

As well as the pushbuttons for controlling the programme machines, the desk unit contains three rotary switches. These switches can be used to set up the train number of any train to be cancelled, the three switches controlling " units," " tens," and " hundreds " columns respectively. When the number is set up, a " cancel " button on the desk unit is depressed, causing the number of the train selected to appear in the wall panel relating to the appropriate programme machine. The desk unit can then be disconnected, but when the programme machine train number coincides with that on the panel (known as the " train cancel visual ") the machine will cancel that train without further action by the supervisor.

" Cancel erase " control

Should a train number be set up for cancellation and subsequently found to be in error, it can be erased by reconnecting the desk unit and pressing a " cancel erase " button.

The East Finchley and Archway signalling was designed and installed by Mr. R. Dell, Chief Signal Engineer, and his staff under the general directions of Mr. C. E. Dunton, Chief Civil Engineer, London Transport Executive.

LONG-WELDED RAIL TRAIN for London Transport

Specially-developed train is capable of loading 300-ft. rails direct from track

THE London Transport Executive recently has brought in service a specially constructed train for handling the 300-ft. long welded rails used on many sections of the London Underground system. It incorporates a special power winch apparatus which for the first time enables 300-ft. rails to be re-loaded on the train from the track.

Past practice, when removing 300-ft. rails from the track, has been to cut them up and load them piecemeal, but the new ability to re-load them in 300-ft. lengths means that they can now often be re-laid at other sites to give a further period of service.

Easy loading

The train will carry up to 18 such rails, weighing some 90 tons, which are carried at an unusually low level, making loading and unloading easier to carry out.

The wagons were built by the Gloucester Railway Carriage & Wagon Co. Ltd. to London Transport designs. The underframes, bogies, and Westinghouse brake systems are of the same type as those of existing 20-ton rail-carrying wagons, but the rail-carrying bolster equipment is of an entirely new design.

Accommodating the load

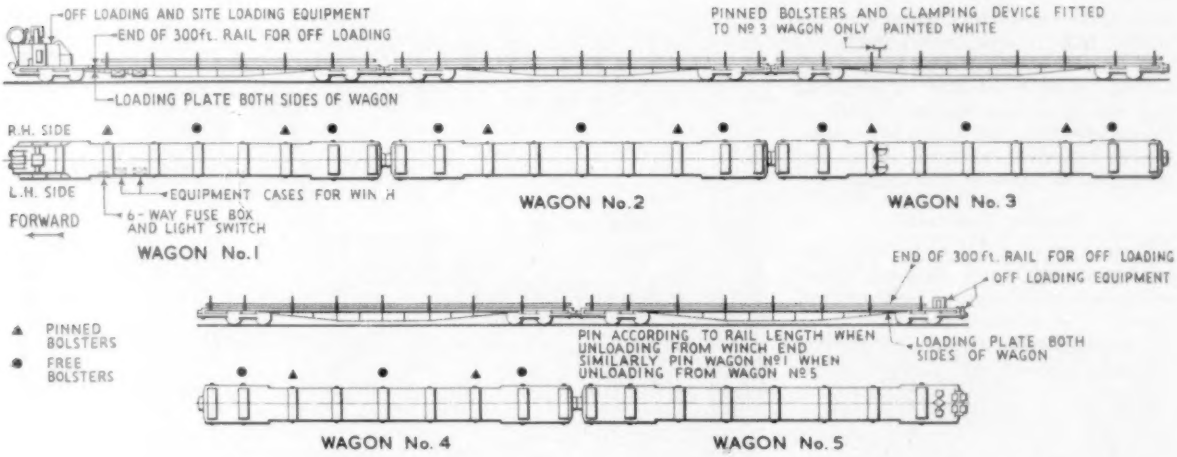
The full load of rails is carried in three tiers, the bottom tier being supported 4 in. above the deck plates by triangular bolsters, at 8-ft. 4-in. centres, bolted to the deck of the wagons, and the second and third tiers being supported by loose bolsters of si milar shape. Niggerbars of heavy channel section are bolted to the solebars of the wagons at each deck bolster position. The loose bolsters between the tiers of rails are connected by locking pins so that the rail load is held together as it moves freely across the fixed deck bolsters on curved track. No rail can move across the wagons independently.

Apart from these fixed and loose bolsters there are pinned bolsters for holding the rails in position laterally and symmetrically about the centre line of the train. These pinned bolsters are positioned on the wagons in relation to each king pin position so as to produce a force sufficient to overcome the friction between the rail load and the fixed deck bolsters and thus bring the rails back into line when the train passes from curved to straight track.

Because of the radius on the foot of bull-head rails, each rail must be pinned at the pinned bolsters to keep it in a railroad position. The pinning arrangement for all other rail sections has been carefully considered to avoid as far as possible having more pin holes in the bolsters than those necessary for bull-head rails.

Securing the load

On the centre wagon of the train, as close as possible to a pinned bolster, is a clamping bar which is firmly secured to the wagon deck by turnscrews. This clamps the rail load at approximately the centre of the rail span. To allow for variation in rail depths, the underface of the pinned bolsters nearest the clamp-


OFF LOADING AND SITE LOADING EQUIPMENT
END OF 300ft. RAIL FOR OFF LOADING
PINNED BOLSTERS AND CLAMPING DEVICE FITTED TO No 3 WAGON ONLY PAINTED WHITE
LOADING PLATE BOTH SIDES OF WAGON
R.H. SIDE
L.H. SIDE
FORWARD
EQUIPMENT CASES FOR WIN H
6-WAY FUSE BOX AND LIGHT SWITCH
WAGON No.1
WAGON No.2
WAGON No. 3
END OF 300ft. RAIL FOR OFF LOADING
OFF LOADING EQUIPMENT
PINNED BOLSTERS
FREE BOLSTERS
PIN ACCORDING TO RAIL LENGTH WHEN UNLOADING FROM WINCH END
SIMILARLY PIN WAGON No1 WHEN UNLOADING FROM WAGON No 5
LOADING PLATE BOTH SIDES OF WAGON
WAGON No. 4
WAGON No. 5

ing bar and the underface of the clamping bar are lined with tough rubber. This is the only position at which the load is secured on the train, as there are no chains at the rail ends, which are free to move longitudinally in transit, giving the effect of a very long leaf spring.

The emphasis throughout the design of the bolster equipment was on the flexibility of the rail load, reducing as far as possible the lateral thrust on the bolsters, wagon underframes, and bogies, so keeping axle stress to a minimum.

LOADING TABLE.

Rail sections	Maximum number of rails on each tier			Total number of rails that can be carried
	1st	2nd	3rd	
95 lb. per yd. B.H. running rails	8	6	4	18
98 lb. per yd. F.B. running rails	6	6	6	18
109 lb. per yd. F.B. running rails	6	6	6	18
106 lb. per yd. F.B. conductor rails	6	6	6	18
150 lb. per yd. F.B. conductor rails	6	6	—	12
130 lb. per yd. conductor rails for tube tunnels	7	7	—	14

Design of electric winch

Loading of rails from the track is carried out with the use of an 8-h.p. electric winch, built to London Transport specification by Clarke, Chapman & Co. Ltd., of Gateshead. The winch is fixed to a rigid platform made from 1-in. steel plate, which is fitted on the trailing end of the last wagon of the train.

For unloading, the train can be hauled by a battery or steam locomotive, but for re-loading from site a battery locomotive must be used. The power supply for the winch is taken from the auxiliary circuit of the battery locomotive through independent fuses at a normal voltage of 310V.

A train line fitted with a special jumper and jumper receptacles on the battery locomotive renders it impossible to cross-connect with the normal control train line jumpers. Four battery locomotives have been adapted to work with the train.

The winch has two independent barrels for lifting and loading at either side of the negative (central) conductor rail and can lift a load of 3 tons at 27½ ft. p.m. Each barrel has 75 ft. of 13/16-in. dia. steel wire rope, and is capable of carrying considerably longer lengths of rope if required.

The winch motor is series-wound and designed to run at 290-340V. from the lead-acid battery of the battery locomotive. It is totally enclosed and watertight, and rated to run intermittently with a 55 deg. C. temperature rise. A magnetic brake is built in the motor frame. The motor is coupled to the barrels through a double-reduction gear, consisting of a worm reduction and spur gear respectively and a specially designed adjustable slip clutch is installed between the two reduction gears as a protection against an overload on each rope. The winch motor is also protected electrically against an overload.

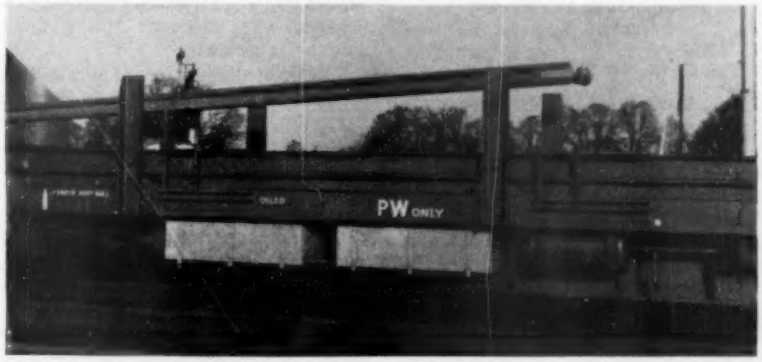
Control equipment for the winch is housed in two sheet-steel cases fitted with London Transport standard removable covers and fastenings and attached to the underframe of the wagon. The control circuit has no-volt protection and also an excess-volt relay to protect the motor should the starter pushbuttons on each side of the winch platform inadvertently be closed when the battery is on charge.

Stop switches

Provision is also made in the circuit for two remote stop switches. These are lock-out pushbuttons which can be operated when standing on the wagon deck behind the winch. The starter buttons are spring-loaded so that the motor cannot run unless pressure is being applied to one of the buttons, giving an automatic deadman device.

Because of the confined space inside the battery locomotive, it would have proved too costly to take the winch supply direct from the main battery. It was convenient to take the supply from the existing auxiliary circuits, provided that the starting peak current was limited to a maximum of 40A.

To achieve this, lock-out coils were added to the resistance contactors to



Special roller guide attachment fitted to end of 300-ft. conductor rail. Note two control equipment cases attached to underframe

prevent the contactors closing until the current falls to the desired level.

A thermal overload relay is provided to trip the circuit-breaker on overload, and the usual few minutes' delay is required before the circuit can be re-made. During this time the winch driver can investigate the cause of the overload.

Loading from track

To load a long rail from the track, the train is positioned with the winch wagon at one end of the rail. A roller with a hinged frame is swung in position over the wagon headstock, and the rail end is lifted up and placed on the roller by the winch. The winch rope is disconnected and a special guide roller attachment is slipped on the rail end. The train is then propelled under the rail, pushing the rail against a stop which is attached to a sleeper at the opposite end of the rail, until approximately the last 20 ft. of rail is overhanging the roller.

The train is then stopped and the winch rope attached to the end of the rail overhanging the roller. Using the winch, the remainder of the rail is pulled on the train.

The special guide roller attachment lifts the rail end gently over the deck bolsters and, on curved track, guides the rail sideways by roller contact with a heavy longitudinal channel held in position by the nigger-bar channels. The ends of the longitudinal channels are specially profiled to carry the guide roller across the gap between wagons.

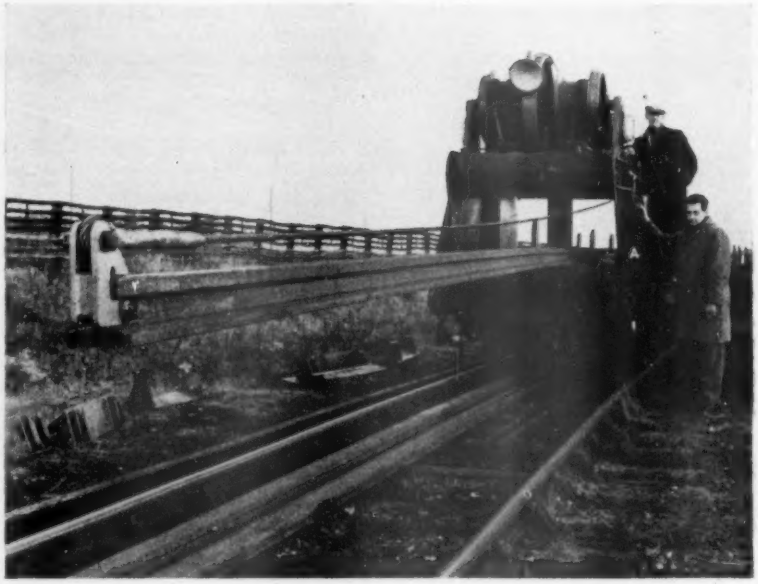
Time to load a 300-ft. rail is 8 min. and rails can be loaded singly or in pairs. The train is built to tube tunnel gauge and to travel over curves as sharp as 3 ch. rad. with a full load of rails. It is designed to load two tiers of rails on straight track or a single tier on a 20-ch. curve. The second tier may be added later from straight track, but the third tier can be loaded only in a depot with the aid of a crane.

The guard, who is in control of all train movements, operates from the winch end of the train, and has telephone communication with the battery locomotive driver, who is at the opposite end. A hand telephone set is provided at each side of the winch platform and a loudspeaker in the battery locomotive cab. Provision is also made for the driver to talk to the guard. A code buzzer is incorporated in the system.

The telephone system is battery-ringing and the telephone battery can be charged from the locomotive battery by a trickle-charger when the telephone is not in use. Spare wires in the trainline have been used to connect the instruments.

Electric lighting is provided on the winch wagon with floodlights fore and aft of the winch.

Rails can be off-loaded by the normal process of securing one end of the rail to a suitable point on the track and moving the train away so that the rail is drawn off over one of the headstock rollers. A similar off-loading apparatus is provided at the other end of the train, so that off-loading can be carried out from either end.



End of 150-lb per yd. conductor rail being lifted on headstock roller. Illustration shows position of winch driver and guard

Design and installation

The special rail-handling equipment was designed under the joint direction of Mr. C. E. Dunton, Chief Civil Engineer, and Mr. A. W. Manser, Chief Mechanical Engineer (Railways), London Transport Executive, and installed on the train under the direction of Mr. Manser. The communications equipment of the train was designed and installed by Mr. R. Dell, Chief Signal Engineer, London Transport Executive, under the general direction of the Chief Civil Engineer.

Re-signalling at Newport, Western Region

(*Concluded from page* 13)

relays. There are 215 of these units. Signal post telephones are C.B.-type with individual lines.

Main cables are of the multi-core impregnated paper - insulated lead-sheathed type, to Western Region Signal Department specifications. Subsidiary cables for external connections are single-core for the leads to rails and multi-core to the point machines and signals. Both are to British Railways Specification No. 972.

Relay rack wiring consists of 1/·044 copper conductors, p.v.c.-insulated, to Western Region Signal Department specification. For inter-rack wiring multi-core cables are used.

The main distribution of power is at 650V. a.c. It is obtained from the local Authority, but there is also an automatically-controlled diesel standby plant. Power is subsequently transformed, and rectified when necessary, to 110 V. a.c. and 50 V. d.c. for signalling, to 110 V. d.c. for point operation, and to 24 V. a.c. for panel indications.

The whole of the circuit design of the signalling, relay room layouts, etc., was carried out to the requirements of Mr. A. A. Cardani, Chief Signal & Telecommunications Engineer, British Railways, Western Region, who was also responsible for carrying out the work on the site.

The erection of signals and fitting of point machines, wiring of locations and alterations at the existing boxes, were carried out by Western Region Signal & Telecommunications Department staff, while the wiring of relay rooms was carried out by the staff of M.L. Engineering (Plymouth) Limited, under the supervision of the W.R. Signal Department's Resident Engineer.

Principal contractors included the following:—

Point machines, signals, and signalling relays	Westinghouse Brake & Signal Co. Ltd.
Signalling control panels	Henry Williams Limited (Integra)
Relay rooms at East Usk Junction signalbox (constructional work)	John Morgan, Cardiff

PERSONAL

Overseas

MR. R. K. INNES, D.L.C., M.I.C.E., M.I.MECH.E., General Manager, Nigerian Railway Corporation, who, as recorded in our issue of June 30, has retired, received his early training with the Great Western Railway

Mr. R. K. Innes

when he entered the Swindon Works in 1915. Between 1917 and 1919 he served with the Royal Naval Air Service. He returned to Swindon at the end of 1922 after obtaining the Loughborough College Diploma in the Faculty of Mechanical & Civil Engineering. In 1923-24 he commanded the Hampshire (Fortress) Company G.W.R., Royal Engineers, Territorial Army. Mr. Innes joined the Bombay, Baroda & Central India Railway as an Assistant Locomotive & Carriage Superintendent in 1924, and became Works Manager, Parel, in the same year. In 1933 he was appointed as the B.B. & C.I.R. observer to the Pope Enquiry Committee. In September, 1939, he was nominated by the Railway Board to serve on the Staff of the Master General of Ordinance as Chief Industrial Planning Officer, to organise surveys and the collation of capacities of the Indian Railway Workshops and civil industry for munitions production, and held successively the posts of Assistant Director, Deputy Director and Director Civil Production (General). On rejoining the B.B. & C.I.R. he was appointed Deputy Locomotive & Carriage Superintendent (Broad Gauge). In 1948 the hitherto distinct broad- and metre-gauge mechanical departments were amalgamated, and Mr. Innes became Chief Mechanical Engineer, with responsibility for workshops and running spheres. He served on the Locomotive Standards, Carriage & Wagon Standards and operating committees. In 1932 he was appointed J.P. Mr. Innes retired from the Indian railway service in 1953, and was appointed Chief Mechanical Engineer, Nigerian Railways, in 1954. He was appointed General Manager, Nigerian Railway Corporation in 1958, and acted as Chairman from June-October, 1960.

MR. YUK NA THALANG, Financial Comptroller of the State Railways of Thailand, who is on a visit to England to study railway conditions and progress, was entertained at a reception at the Charing Cross Hotel, London, on July 4, by the Chairman and members of the United Kingdom Railway Advisory Service.

MR. A. C. MUKERJI, General Manager, Southern Railway of India, has been appointed Director General, Research, Design & Standards Organisation of the Railway Board of the Government of India.

MR. W. H. NEALE, Assistant to Manager, Foreign Freight Sales, Canadian National Railways, who has been appointed Sales Manager, Canadian National Railways in the Orient, joined the C.N.R. Passenger Traffic Department in 1943 at Winnipeg. He held posts in Edmonton, Regina, Prince Rupert,

Mr. W. H. Neale

Vancouver, and Winnipeg until 1951, when he transferred to the New York office. Two years later he moved to Boston and, in 1955, was appointed Travelling Passenger Agent, Seattle, becoming Assistant Australian Traffic Manager later that year, with headquarters in Sydney. Mr. Neale returned to Canada in 1959 to become Assistant District Passenger Agent, Toronto, and the following year he became Assistant to Manager, Foreign Freight Sales, Montreal.

MR. W. G. BOYD, Associate Commission Counsel, Canadian National Railways, has been appointed Commission Counsel. MR. P. TASCHEREAU, Solicitor, has been appointed Assistant General Solicitor.

MR. S. S. CHAMBERS, Assistant to General Manager, Ottawa, Canadian National Railways, who, as recorded in our issue of June 30, has been appointed General Manager,

Mr. S. S. Chambers

Canadian National Hotels Limited, joined the C.N.R. Hotels Department in 1923 at the McDonald Hotel, Edmonton. After holding positions in Winnipeg, Port Arthur, and Ottawa, he became Convention Manager, Hotel Vancouver, in 1943. Mr. Chambers was appointed Manager, Nova Scotian Hotel in 1951 and Assistant to General Manager, Ottawa, in 1954.

Industrial

LT.-COL. L. F. R. FELL, Consultant to Rolls Royce Limited on railway traction, is to retire.

MR. W. HOWSON and MR. J. W. SUTHERLAND have been appointed to the board of Bernard Wardle (Everflex) Limited.

MR. W. G. MILLER has been appointed Executive Vice-President of Alco Products, Inc.

MR. C. L. SMITH, Managing Director, Gloucester Carriage & Wagon Co. Ltd., has resigned from the board of the company and its subsidiaries.

MR. V. S. RISCOE has been appointed General Manager of Associated Electrical Industries Limited's division newly formed to manage the company's home district offices.

MR. C. F. KEARTON, Deputy Chairman, Pinchin, Johnson & Associates Limited, has

resigned from the board. MR. W. T. BRANSCOMBE has relinquished the position of Managing Director and has been appointed Deputy Chairman. MR. W. G. DAROUX has been appointed Managing Driector, MR. G. F. INGHAM CLARK has been appointed Commercial Director, and MR. W. S. KERR has been appointed Sales Director.

MR. H. J. NORTHEAST, General Sales Manager, Dunlop Rubber Co. Ltd., Chemical Products Division, Birmingham, has been elected Chairman of the Midland Market Research Group for 1961-62.

MR. J. F. PRINCE, Export Sales Manager, Witton Works, General Electric Co. Ltd., has retired. He has been succeeded by MR. K. D. STARR, Director of British General Electric Co. of Central Africa (Pvt.), Ltd.

MR. G. E. CHICKEN, Commercial Manager, Dorman Long (Steel) Limited, has retired from his executive position but will continue as a non-executive director. MR. G. FOSTER has been appointed General Manager Production, and MR. E. A. HIGHTON has been appointed General Sales Manager of Dorman Long (Steel) Limited.

MR. C. HIPWELL, Director & General Manager, Redpath Brown & Co. Ltd., has resigned his executive appointments but will continue as non-executive director. He is succeeded as General Manager by MR. J. B. BOLCKOW, who has also been appointed a Special Director of Dorman Long & Co. Ltd.

Permanent Way Institution

MR. HORACE JANES, Hon. Secretary of the Permanent Way Institution who, as recorded in our June 23 issue, has retired, began his railway career with the South Eastern & Chatham Railway in 1903, and in 1904 entered the District Engineer's Office, Tonbridge. In 1917 he was appointed Assistant District Engineer and took charge of the district in the absence of the District Engineer on active service until 1919. At the grouping of the railways in 1923 he transferred to the London East Divisional Engineer's Office at London Bridge. When the Southern Region suburban electrification scheme was put in hand Mr. Janes was selected to carry out the outdoor conductor rail and table route work. On the completion of the scheme in 1926 Mr. Janes was attached to Waterloo and continued on similar work until the opening of the last section to Gillingham and Maidstone in July, 1940. In 1954 Mr. Janes retired from railway service but returned as Temporary Technical Assistant until his final retirement in 1959. He joined the Permanent Way Institution in 1908, became Corresponding Secretary, London Section, in 1912, Assistant General Secretary in 1934, and Hon. Secretary in 1940.

Mr. Horace Janes

MR. J. A. R. TURNER, A.M.INST.T., who, as recorded in our issue of June 23, has been elected Hon. Secretary of the Permanent Way Institution, commenced his railway service with Southern Railway in the Chief Commercial Manager's Office at London Bridge in May, 1926. On being transferred to the Civil Engineer's Department in October, 1927, he was attached to the District Engineer's Office, London Bridge. Subsequent appointments with the Southern Company were London (West) Divisional Engineer's Accounts Office, Clapham Junction in 1933, and Chief Engineer's Statistical Section at Waterloo in January, 1936. On the formation of the former Railway Executive in January, 1948, Mr. Turner was appointed Clerical Assistant to the Member for Civil and Signal & Telecommunications Engineering matters. Later in that year, Mr. Turner was appointed Secretary of the Civil Engineering Committee, which position he still holds. In 1953 he was appointed as Assistant to Chief Officer, Civil Engineering in the interim organisation, following the abolition of the Railway Executive, and from January 1, 1955, Mr. Turner has been responsible for administrative and staff matters relating to the Civil Engineering Department at B.T.C. Headquarters to the Chief Civil Engineer, British Railways Central Staff. Mr. Turner joined the Permanent Way Institution in 1930, attached to the London Section. He was elected Corresponding Secretary of the London Secretary with effect from 1946, and Assistant Secretary of the Institution in January, 1958.

Mr. J. A. R. Turner

British Railways

MR. H. S. REX, Head of Passenger Section, Traffic Headquarters, York, British Railways, North Eastern Region, has retired.

MR. D. H. BINYON, District Outdoor Machinery Engineer, Derby, Chief Mechanical & Electrical Engineer's Department, British Railways, London Midland Region, has retired.

MR. D. REEVES, Works Manager, Walkergate Works, British Railways, North Eastern Region, has been appointed Outdoor Carriage & Wagon Engineer, York.

Barony

SIR BRIAN ROBERTSON, former Chairman the British Transport Commission, who was awarded a Barony in the Queen's Birthday Honours List, is to take the name, style, and title of Baron Robertson of Oakridge, of Oakridge in the County of Gloucester.

Institute of Fuel

DR. JAMES BURNS has been elected President of the Institute of Fuel to take office in October. SIR HAROLD HARTLEY, a former Vice-President of the London Midland & Scottish Railway Company, has been made an Honorary member of the Institute.

Transport Users' Consultative Committee

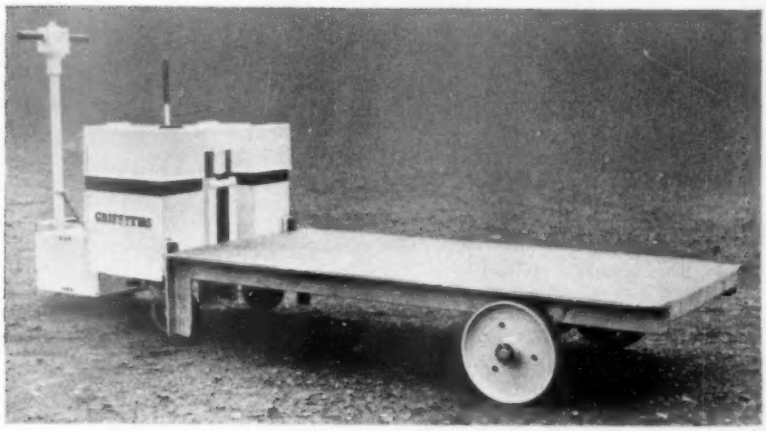
COUNCILLOR L. B. PARKES, Walsall Borough Council, and Chairman of its Transport Committee, and MR. J. ROYSTON, Line Traffic Manager, Crewe, British Railways, London Midland Region, have been appointed members of the Transport Users' Consultative Committee for the West Midland Area until June 30, 1962. They replace ALDERMAN G. C. W. JONES and MR. GEORGE DOW.

Obituary

We regret to record the death, on June 29, of MR. G. F. THURSTON who was, until his retirement in 1935, Divisional General Manager, Southern Area, London & North Eastern Railway.

We regret to record the death on June 29, of MR. A. C. B. PICKFORD, who was, until his retirement in February this year, Assistant General Manager (Traffic), British Railways, Western Region. Details of Mr. Pickford's career were published in our February 17 issue.

NEW EQUIPMENT *and Processes*



TRUCK POWER-UNIT

Known as the " Pedi-power " a new battery-operated truck will convert existing hand trucks into power-operated ones.

The unit has a capacity of 2,000 lb., and is said to be applicable to virtually every type of truck.

Two stabilised castors are fitted at the back, these enable the towing unit to pivot on the wheels of the truck which is towed; as well as making the steering light this gives a close turning circle. When the unit is being driven independently the castors are convertible into fixed wheels There are two speeds in each direction. All controls are of the dead-man's type and are located on the steering handle.

The 12-V d.c. motor is powered by cells ranging from 99 to 165 amp/hr. capacities, depending upon requirements.

The height of the unit is 23 in. and the width 25½ in. The maximum forward speed is 3 m.p.h.

Further details may be obtained from the Griffiths (Lambeth) Engineering Co. Ltd. 60 Baylis Road, London, S.E.1.

PULLEY BLOCKS

A new range of " Colossus " triple-geared pulley blocks has been introduced.

The applied effort is transmitted by planetary gears with double pinions which rotate in an inner-geared annulus, integrated in the suspension frame. This arrangement is said to give great stability. Internal friction is reduced by the incorporation of ball-bearings, self-lubricating collars, and precision-cut heat-treated gearing.

The blocks are available in capacities ranging from 5 cwt. to 20 tons as standard, but sizes up to 60 tons can be supplied.

Further details may be obtained from Anderston Clyde Engineers Limited, Irk Vale Works, Chadderton, Lancs.

SMOKEMETER

A portable measuring instrument has been produced to measure the density of exhaust gases of diesel engines.

The equipment consists of a gas sampling probe and pump, with facilities for attaching the pump to the exhaust pipe. A sample of the gas is extracted and aspirated through a filter paper, which retains the soot content. The deposit on the filter paper is then evaluated with the aid of the instrument illustrated, which can be operated by a dry battery or vehicle battery.

Evaluation is effected by measuring the amount of unabsorbed light which is reflected from the darkened filter paper on to a photo-electric cell. The current generated corresponds to the degree of darkening on the filter paper and is indicated on the 0-10 scale of the micro-ammeter.

Further information is available from Dunedin Engineering Co. Ltd., 73, Mortimer Street, London, W.1.

PLASTIC HANDRAIL

Osmarail is a p.v.c. handrail which fits the three standard sizes of core rail now in general use. A standard handrail is also available, which incorporates this material fitted on a stove-enamelled steel-core rail mounted on steel brackets.

These handrails are available in 14 colours. They are said to be unaffected by weathering and to be resistant to a wide range of chemicals. They possess good abrasion resistance.

Further details may be obtained from Osma Plastics Limited, 551 London Road, Isleworth, Middlesex.

MOBILE PLATFORM

A new application of Dexion slotted angle and open steel plank is the construction of mobile maintenance platforms at British Railways Wagon Repair Depot, Simonside, Co. Durham.

The superstructure above the working level incorporates a T-section bar to help support the heavier types of pneumatic tools.

A special locking device on the castors prevents accidental movement of the platform.

Further details may be obtained from the Dexion Group, Maygrove Road, London, N.W.6.

BALLAST CLEANER

The Hunslet ballast-cleaning machine, which has been developed with the assistance and co-operation of the North Eastern Region, British Railways, cleans six-foot and shoulder ballast at operating speeds up to 600 yards an hour, during which period it can handle 300 tons of stone ballast.

It is a self-propelled vehicle able to travel to the working site under its own power. Route availability is high, as the machine is designed to a 20-ton axle-load and is within British Railways' L1 loading gauge on curves down to six-chains radius.

Power is provided by a Rolls-Royce diesel engine developing 208 h.p. at the continuous rating. It drives four Deri-Sine duplex hydraulic pumps through a toothed belt and gearbox.

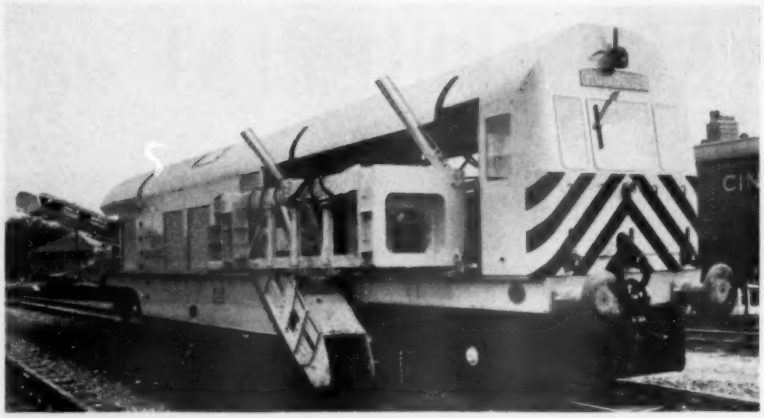
Two digging heads are provided, one on each side. They are individually controlled. The digging belts are hydraulically driven and have hardened-steel picks.

Double-deck vibrating screens have a mesh suitable for 2-in.–¾-in. ballast. They are divided by a centre plate to provide independent screening for the left- and right-hand digging heads. Cleaned ballast is returned on both sides and the dirt is disposed of by two conveyors.

The leading bogie is driven by an 80 h.p. hydraulic motor and two-speed epicyclic gearbox.

Leading dimensions are:—length 65 ft. 2 in., width travelling 8 ft. 1½ in., width, both heads working, 15 ft. 2 in., height 12 ft. 11½ in. Weight in working order is approximately 65 tons, and the maximum travelling speed is 20 m.p.h.

Further details may be obtained from the Hunslet Engine Co. Ltd., Leeds, 10.



CONCRETE SKIP

A new twin concrete skip is claimed to do much to streamline the process of distributing concrete from the mixer to the pouring point by crane.

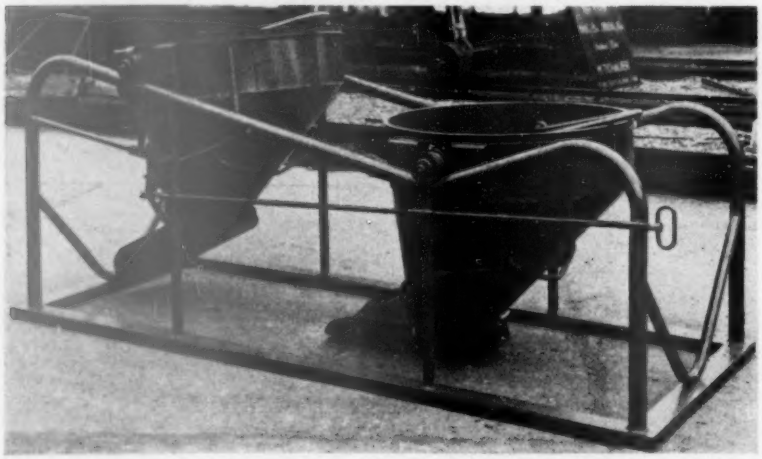
The complete unit consists of two ½-cubic-yard capacity conical skips and a suitably-angled tubular stand mounted on a channel base. The stand supports one skip at a height suitable for filling from the mixer and a second skip at an upper position awaiting filling. Each skip is equipped with rollers to allow for easy run down into the filling position. A pull rod, that can be fitted on either side of the stand as required, operates a release peg through a cranked lever to transfer the empty skip from the upper position.

After the lower skip has been filled, the crane hook is attached and it is transported to the pouring point. The release lever is then pulled allowing the second skip to run down into the filling position. Consequently there is always a full skip awaiting distribution.

A further advantage of the skip is that it is conical in shape, which means there will be little or no adhesion of concrete to the sides, and the folding discharge chute allows for pouring into columns at different angles—an operation which is not possible with conventional skips. In addition the discharge chute has a short arc, thereby giving a greater degree of control in pouring.

The skips have a diameter (at top) and height of 38 in. and weigh 210 lb. each.

Further information may be obtained from the George Cohen 600 Group Limited, Wood Lane, London, W.12.



BASIC PIGMENTS

A new range of non-dusting basic pigments has been produced by Ferro Enamels Limited. These are claimed to have stability in heat and light fastness to temperatures in excess of 300° C. They are stated to be non-bleeding and migrating, and to give good tintorial power, as well as clean and bright colour shades. They have minimum contamination and purging time. The colours can be blended providing a variety of colour shades with a small colour range.

These pigments are also suitable for all grades of polystyrene, polyethylene, nylon, polypropylene, cellulose acetate, phenolics, ureas, polyester and epoxy resins and P.V.C. (with the exception of Brown FW 1134 and 1135 and Black FW 1731) and are said to be low in cost.

Further details may be obtained from the maker, at Wombourn, Wolverhampton.

METAL SPRAYING PISTOL

The Berk 61 powder-metal spraying pistol is capable of rapidly spraying large areas of structural steelwork or matching-in with automatic grit-blasting installations.

The pistol is said to deposit zinc powder with an efficiency as high as that obtained with a 35 lb. an. hr. pistol, with the same gas and air consumption, but at a rate of 110 lb. an hr. This is approximately equivalent to the deposition of a ·004 in. coating over 650 sq. ft. an hr. This performance is achieved by a nozzle which projects powder, gas, and air through alternate and concentric jets.

The nozzle, which is claimed to be easily and cheaply replaced, is the only component which can require maintenance.

Further details may be obtained from F. W. Berk & Co. Ltd., Brent Crescent, North Circular Road, London, N.W.10.

British Transport Commission results for 1960

Increase in railway receipts nullified by wages settlement. Other undertakings increase their profitability

In spite of increased receipts, improved rates of pay costing about £33 million increased the working deficit on British Railways to £67·7 million, an increase of £25·7 million. This was disclosed in the annual report and accounts of the British Transport Commission published on June 30. Other undertakings in the organisation had an overall working surplus of £31·4 million, or £2 million more than in 1959. The combined result is thus a working deficit of £36·3 million. After adding interest and other central charges, amounting to £45 million for British Railways and £19·6 million for the other undertakings, the overall deficit was £100·9 million, British Railways deficit was £112·7 million. Substantial increases in receipts, £21·1 million, failed to counterbalance the increase in rates of pay and other working expenses. In total the working expenses were up by £46·8 million, of which £33 million arose from increases in rates of pay. The results for the various activities are summarised in the accompanying tables

	Net receipts Year 1960 £ million	Better (+) or worse (−) than 1959 £ million
Principal carrying activities:		
British Railways (including C. & D. services) (deficit) ...	67·7	− 25·7
British Road Services	1·8	− 1·4
Provincial and Scottish Buses ...	6·5	− 0·1
London Transport:		
Road	5·4	+ 1·4
Rail	2·4	+ 0·4
Ships	3·9	—
Inland Waterways: carrying (deficit)	0·2	—
Total: Carrying activities (deficit)	47·8	− 25·2
Other principal activities:		
Docks, Harbours and Wharves ...	3·6	+ 0·8
Inland Waterways: tolls, etc. (deficit)	0·5	+ 0·2
Hotel and catering services:		
Hotels	0·5	+ 0·1
Refreshment rooms	0·4	—
Restaurant cars (deficit) ...	0·4	+ 0·1
Letting of land and buildings not in operational use	5·0	+ 0·3
Total: other principal activities ...	8·6	+ 1·4
Miscellaneous activities	2·9	+ 0·2
Working deficit	£36·3	− £23·7

The report stated that the new multiple-unit diesel services continued to stand high in public favour and that this was clearly demonstrated by the gains in gross revenue compared with previous operation by steam. The multiple-unit programme was virtually completed, having taken about seven years. Out of a total of 4,110 vehicles authorised, 3,694 were in operation at the end of the year and a further 67 had been delivered. The few orders outstanding should be completed in 1961.

The new Pullman diesel trains between St. Pancras and Manchester, which started in July, 1960, and the similar trains between Paddington and Wolverhampton, and Paddington and Bristol, which began in September, 1960, attracted immediate attention and by the end of the year had built up a patronage averaging some 85 per cent of capacity on the London Midland Region and 57 per cent on the Western Region. On another new intercity diesel service, introduced experimentally in July between Aberdeen and Inverness, the timing was the fastest ever run between those points.

The increase in receipts on some of the

BRITISH TRANSPORT COMMISSION: CONSOLIDATED BALANCE SHEET at DECEMBER 31, 1960

December 31, 1959 £		£	£	December 31, 1959 £		£	£
	Current Liabilities—				**Current Assets—**		
4,800,000	Bank advances	7,500,000		12,048,834	Bank balances and cash	9,847,998	
101,226,246	Creditors and accrued expenses ...	107,050,326			Marketable securities (Market value £646,247)	308,991	
21,172,813	Interest (less income tax) accrued on capital liabilities	23,296,061		309,125	Grants on account of year 1960 received from the Minister of Transport in 1961 (see Notes on Accounts)	27,000,000	
127,199,059			137,846,387	—	Outstanding traffic accounts	71,141,934	
				69,262,233	Other debtors and payments in advance	25,804,949	
	Deposits—			24,017,466	Stores and materials	107,850,931	
44,028,824	Staff Savings Banks	44,708,487		106,832,552			
120,207,647	Staff Superannuation Funds	127,348,351					241,954,803
164,236,471			172,056,838	212,470,210			
	Provisions— (See Notes on Accounts)				**Investments in respect of British Transport Stock Redemption Fund Accounts** (Market value £42,181,498)		45,342,405
115,253,274	Retirement Benefits	116,255,538		40,850,617			
15,833,911	Taxation	16,830,238					
5,620,353	Internal Insurance	5,671,924			**Fixed Assets and Goodwill** on bases indicated in supporting statements and notes on accounts		
136,707,538			138,757,700				
				9,691,974	Interest in non-controlled undertakings	9,716,391	
	Capital Liabilities—				Interest in subsidiary companies not engaged in the principal activities of the Commission	6,619,597	
1,443,555,196	British Transport Stock	1,443,555,087		5,391,649			
325,160,000	Advances by the Minister of Transport under Acts other than the Transport (Railway Finances) Act 1957 as amended	470,132,800			Rolling Stock, Vehicles, Ships and Plant and Equipment ...	£ 1,280,172,617	
276,780,567	Under the Transport (Railway Finances) Act 1957 as amended ...	302,164,133		1,181,858,422	*Deduct* depreciation Account	465,135,551	
2,045,495,763			2,215,852,020	440,754,237			
				741,104,185		815,037,066	
41,321,081	**Capital Redemption Accounts** ...		45,824,633				
	Net Revenue Account—				Land, Buildings, Permanent Way, Docks, canals and other works	1,318,463,655	
	Surplus for years 1956 to 1960 in respect of activities other than British			1,274,311,121	*Deduct* maintenance equalisation account	202,317,947	
18,928,362	Railways		30,696,611	216,220,772			
				1,058,090,349		1,116,145,708	
				42,386,339	Goodwill	42,471,559	
				1,856,664,496			1,989,990,321
				6,062,925	**Discounts less Premiums on Issue of British Transport Stock,** less amounts written off		5,498,925
				417,840,026	**Special Account** established pursuant to Section 3 of the Transport (Railway Finances) Act 1957	563,050,998	
				—	*Deduct* grants received from the Minister of Transport up to March 31, 1961	104,803,263	
				417,840,026			458,247,735
2,533,888,274			2,741,034,189	2,533,888,274			2,741,034,189

Note. Estimated further expenditure on Capital Account authorised at December 31, 1960: £270,000,000

BRIAN H. ROBERTSON *Chairman*
J. BENSTEAD *Deputy Chairman*
REGINALD WILSON *Member*

CONSOLIDATED WORKING RESULTS OF PRINCIPAL CARRYING ACTIVITIES

	Passenger and freight services of British Railways		C & D and other road freight services of British Railways		Road haulage by British Road Services		Road Passenger Services of Provincial and Scottish Groups		London Transport services				Ships: Passenger and freight services		Inland Waterways: carrying operations		Grand total	
									Road		Railway							
	£		£		£		£		£		£		£		£		£	
Gross Receipts:																		
Passenger	151,274,093				—		62,414,322		56,913,594		26,357,431		7,414,845		—		304,374,285	
Freight (including parcels and mails)	316,879,749				53,367,470		—		—		—		10,188,329		926,926		381,362,474	
Miscellaneous (including Letting of sites and premises on properties in operational use (net) and Commercial advertising (net))	10,417,215				2,147,045		951,686		733,745		1,233,518		1,582,049		53,393		17,118,651	
Total	478,571,057				55,514,515		63,366,008		57,647,339		27,590,949		19,185,223		980,319		702,855,410	
Percentage of grand total—Year 1960	68				8		9		8		4		3		—		100	
—Year 1959	68				8		9		8		4		3		—		100	
	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent
Working Expenses:																		
(a) Train, vehicle and ship operating expenses	189,031,954	35	12,856,577	58	24,151,230	45	39,470,868	70	34,926,428	67	8,817,496	35	5,270,818	34	340,783	29	314,866,154	42
(b) Maintenance of rolling stock and ships	111,709,624	21	4,635,305	21	8,823,911	16	9,749,030	17	9,322,888	18	4,170,678	17	3,321,906	22	224,555	19	151,957,897	20
(c) Other traffic expenses	91,489,079	17	1,633,884	7	10,891,457	20	4,150,591	7	3,863,463	7	5,547,978	22	5,464,889	36	384,541	33	123,335,892	16
(d) Signalling expenses	37,804,911	7	—	—	—	—	—	—	—	—	1,731,256	7	—	—	—	—	39,536,227	5
(e) Maintenance of way and structures	83,543,977	16	106,701	1	615,319	1	720,664	1	732,529	1	3,016,726	12	20,093	—	—	—	88,756,009	12
(f) Vehicle licence duties and inland waterway tolls	—	—	587,722	3	1,041,513	2	447,845	1	290,285	1	—	—	—	—	149,699	13	2,517,064	—
(g) General	21,150,030	4	2,313,101	10	8,329,989	16	2,323,816	4	3,109,496	6	1,857,103	7	1,193,472	8	66,047	6	40,342,054	5
	534,729,635	100	22,133,290	100	53,763,429	100	56,862,814	100	52,244,089	100	25,141,237	100	15,271,178	100	1,165,625	100	761,311,297	100
(h) Charges to British Railways for road conveyance of freight	21,876,927		21,876,927														—	
(i) Other charges to British Railways and other activities	—		256,363														256,363	
	556,606,562																761,054,934	
Deduct (j) Internal charges raised for transport services	10,383,425																10,383,425	
Total	546,223,137		—		53,763,429		56,862,814		52,244,089		25,141,237		15,271,178		1,165,625		750,671,509	
Net Receipts	67,652,050 (deficit)				1,751,086		6,503,194		5,403,250		2,449,712		3,914,045		185,306 (deficit)		47,816,099 (deficit)	
Operating ratio: percentage of working expenses to gross receipts	114				97		90		91		91		80		119		107	
Year 1959	£				£		£		£		£		£		£		£	
Gross receipts	457,422,748				52,544,965		61,930,129		55,772,696		25,323,894		18,283,296		865,532		672,143,260	
Working expenses	499,392,935				49,418,649		55,359,788		51,775,772		23,291,067		14,401,496		1,080,606		694,720,313	
Net receipts	41,970,187 (deficit)				3,126,316		6,570,341		3,996,924		2,032,827		3,881,800		215,074 (deficit)		22,577,053 (deficit)	
Operating ratio: percentage of working expenses to gross receipts	109				94		89		93		92		79		125		103	

NOTE: The classification of Working Expenses under the main heads shown above, while broadly uniform, differs to some extent as between one activity and another

newly-electrified services had been most encouraging. In the first full year of operation of the electric trains between London, Sheerness, Ramsgate, and Dover Marine, receipts in the area increased by about a third over those of the previous period.

The report expressed disappointment with holiday rail travel in 1960, and stated that both the poor weather and the increase in private holiday motoring could have been responsible. The discount on mid-week summer travel was increased from 4s. to 5s. in the £ during 1960.

A massive effort was made in 1960 to boost freight traffic. Express freight services were developed and there were extended facilities for assured next-day arrivals. The proportion of freight-train mileage run with stock fully or partially-fitted with the vacuum brake rose from 36 per cent in 1959 to 39 per cent last year. This further upgrading of freight services resulted at the end of 1960 in the running of 173 more express freight trains a day compared with a year earlier. Daily fast overnight "Condor" service between London and Glasgow, the new "Tees-Tyne Freighter" to Newcastle and Middlesbrough, and its counterpart; the "King's Cross Freighter," offered assured next-day delivery for full loads and containers from the principal North-East towns to London. Other container and next-day delivery services were introduced in the Eastern Region where container forwardings rose by 15 per cent over the high level reached in 1959.

Improving freight traffic

Efforts were made to develop the movement by rail of solids and liquids in bulk. Another 297 "carflat" wagons to carry motor-cars for export and home delivery were added to the 105 available to manufacturers in 1959. Other freight stock introduced in 1960 included 367 bulk material vehicles, of which 200 were designed for pressurised discharge, and 510 banana vans built to a new standard of insulation. British Railways had progressively expanded the Export Express Service over the last four years. By the end of 1960 this service assured next-day arrival for wagon-load traffic at 10 ports. The assured arrival services to inland destinations were also extended in 1960 between Perth and Inverness, between Sheffield and Glasgow, and between London and 24 points westward, southward and eastward.

During the year the Government had begun to express doubts about the extent of the financial return from modernisation, and it was decided in February, 1960, that schemes costing more than £250,000 should be examined and agreed by the Minister. This had its effect on the tempo of the modernisation

CONSOLIDATED WORKING RESULTS OF PRINCIPAL ACTIVITIES OTHER THAN CARRYING

	Docks, harbours, and wharves	Inland waterways: other than carrying operations	Hotels and Catering				Letting of land and buildings not in operational use	Grand Total
			Hotels	Refreshment rooms	Restaurant cars	Total		
	£	£	£	£	£	£	£	£
Gross receipts	21,282,562	2,966,627	8,618,243	10,523,687	4,442,315	23,584,245	7,903,069	55,736,503
Working expenses	17,720,621	3,436,306	8,145,869	10,074,383	4,854,772	23,075,024	2,931,483	47,163,434
Net receipts	3,561,941	469,679 (deficit)	472,374	449,304	412,457 (deficit)	509,221	4,971,586	8,573,069
Year 1959								
Gross receipts	21,777,795	2,706,254	8,028,023	10,427,363	4,284,656	22,740,042	7,492,331	54,716,422
Working expenses	19,010,467	3,401,952	7,633,444	9,929,455	4,766,821	22,329,720	2,779,294	47,521,433
Net receipts	2,767,328	695,698 (deficit)	394,579	497,908	482,165 (deficit)	410,322	4,713,037	7,194,989

programme, which in consequence was slowed down. Limitations on investment and slowing down of the pace of modernisation had particularly affected progress in the rebuilding of passenger stations but a few new premises and improvements were completed in 1960. Out of a total of 1,791 diesel main-line locomotives authorised, 837 had been delivered by the end of 1960, compared with 420 a year earlier. Higher speeds were now possible over many parts of the railway network as a result of improved track and modern colour-light signalling. This used power-operated signal-boxes, each controlling much longer sections of track. By the end of 1960 about 790 route-miles of main-line track had been equipped with the automatic warning system, and some 3,307 locomotives and multiple-unit vehicles had been correspondingly fitted. Replacement of the older passenger carriages continued and nearly 2,000 new vehicles, including multiple units, were delivered. Virtually the whole of the 300,000 vans and open wagons used for express freight have now been fitted with continuous vacuum braking. Fourteen double-decker vans were ordered for the ever-increasing number of cars being carried on car sleeper trains between London and Scotland. The new vans will almost double the existing car-carrying capacity of this service. Fifty more "Roadrailers" had been ordered. Tests were continued of prototype containers constructed of light alloys, plastic, fibre glass, and other materials.

At the end of 1960 fares were not yet at parity with the prewar level when account was taken of the change in the value of money.

The level of fares was only a small element in personal expenditure—at any rate on average. Increases in fares were needed not only to offset changes in the value of money but also to compensate for costly trends in the patterns of traffic. On the Southern Region, for example, the peak hour traffics in London were higher in 1960 even than during the oil crisis in the Spring of 1957. One hour in the morning and one hour in the evening together accounted for 44 per cent of the passenger movement. The report also pointed out that the average level of railway freight charges had fallen in the past year.

Whatever the new form of structure introduced into the nationalised transport undertakings in future, the fundamental problem would remain of reconciling the growth and the freedom of private transport with the need to preserve public services which are healthy and efficient. The Commission welcomed the reorganisation of the financial structure, which it had for some time regarded as essential. In its opinion it was too soon to judge whether the financial relief implied by this reorganisation would be sufficient to enable British Railways to meet all its financial obligations and to sustain the scale of services which the nation expected.

The report was signed by Sir Brian Robertson, who was succeeded as Chairman of the British Transport Commission by Dr. Richard Beeching on June 1, 1961.

Observation cars in Scotland

The two observation cars designed by Mr. O. V. S. Bulleid for use on the "Devon Belle" are now in use in Scotland.

After service in the London Midland Region, on Welsh scenic tour trains, one of these cars has been transferred to the Inverness-Kyle of Lochalsh line. This is attached to the morning train from Inverness and returns on the evening train from Kyle. It is understood that the running is for an experimental period.

The second car is running between Glasgow and Oban. The use of observation cars on this line dates back to the days of the Caledonian Railway but was discontinued when the "Maid of Morven" was withdrawn.

The ex-"Devon Belle" cars were in good condition when received by the Scottish Region and a coat of paint was all that was required to freshen up the car transferred to the Kyle of Lochalsh line.

Railway Students' Association

The Railway Students' Association held its twenty-fifth annual convention at Oxford during the period June 30-July 5. The Association's President for the current year, Mr. J. R. Hammond, General Manager, British Railways, Western Region, presided at two meetings held in Oriel College. At the first of these on July 1, Mr. D. L. Munby, Reader in the Economics and Organisation of Transport, University of Oxford, addressed the Convention on "The Future of the Railways," and on July 3 Mr. G. A. V. Phillips, Divisional Traffic Manager (London), British Railways, Western Region, read a paper on "The problems associated with future developments of railways in the London Division of the Western Region." Each session was followed by a discussion.

During the course of the Convention a series of visits took place to local industrial organisations and railway installations, including Morris Cowley Works, the Western Region Road Motor Engineer's Workshops, and British Road Services Depot at Oxford, as well as inspections of the Locomotive Depot, Hump Yard and the passenger station at Banbury. Members taking part in the Convention also enjoyed a conducted tour of the Oxford University Colleges and a visit to Blenheim Palace.

The Railway Students' Association was originally formed in 1909 and, in addition to its winter activities, which consist of monthly meetings in London under the University auspices and visits to transport and industrial installations, it holds a Convention each year during the Summer at a centre of importance affording both scope for the study of transport and related industries and cultural amenities. It was for these reasons that Oxford was selected for the 1961 Convention. Previous Conventions had been held, among other places, at London Glasgow, Edinburgh, Aberdeen, Nottingham, Sheffield, Exeter and St. Andrews since the war, as well as at a number of Continental centres.

Speed-up on Eastern Region

The "West Riding" express, which runs between Kings Cross, Leeds and Bradford on the Eastern Region of British Railways, will be the fastest-timed train on British Railways when the new winter timetable comes into force on September 11. It will cover the 106½ miles between Hitchin and Retford in 89 minutes start-to-stop, an average speed of nearly 72 m.p.h.

Other highlights of the winter timetable include: a big rail "speed-up" between Kings Cross and the North, and a total of 29 runs in the Eastern Region timed at a mile a minute or more, as compared with six last winter, new through services between Kings Cross-Halifax and Huddersfield, and Kings Cross-Sheffield, and accelerated services, introduced during the summer, continue between Kings Cross-Grimsby-Cleethorpes, and Kings Cross-Aberdeen.

Compared with last winter, services on the Great Eastern main line between Liverpool Street and Norwich will be accelerated as the pace of modernisation work progresses. Some trains withdrawn will be restored.

On the Great Northern line the acceleration of certain trains will be, from Kings

Cross: 7.45 a.m., the "West Riding," 44 min.; 5.25 p.m., the "Yorkshire Pullman," 47 min.; 7.30 p.m., the "Aberdonian," 43 min. From Leeds, 7.30 a.m., the "West Riding," 45 min.; 5.29 p.m., 55 min.; from Newcastle, 7.50 a.m., 59 min.

A through service will be provided in each direction between London and Sheffield by the 7.45 a.m. Kings Cross to Leeds and Bradford. This train will convey through carriages which will be detached at Retford giving a Sheffield arrival at 10.35 a.m., less than three hours from London. The return departure is at 5.42 p.m. with coaches attached at Retford to the 5.29 p.m. from Leeds and Bradford due Kings Cross at 8.42 p.m. Another through service will also be provided between Kings Cross and Halifax and Huddersfield by the 1.18 p.m. Kings Cross-Leeds and the 7.42 a.m. Leeds-Kings Cross. The daytime "Anglo Scottish Car Carrier" train will continue to operate until September 30. Its companion night service, the "Car Sleeper Limited," will operate until October 15.

On the Great Eastern line, as engineering work for modernisation progresses, trains between Liverpool Street, Colchester, Ipswich and Norwich will be accelerated. The 10.30, 11.30 a.m. and the 1.30 and 2.30 p.m. Liverpool Street-Norwich trains will have their journey times reduced by 10 minutes. In addition, some weekday trains withdrawn last winter because of engineering work are being restored.

Alfred Herbert facilities in Leeds

Alfred Herbert Limited opened a new Leeds branch, at 311, Dewsbury Road, on July 3. This will provide a service in Yorkshire (apart from western fringes), Northumberland, Cumberland, Westmorland, Durham, part of Lancashire, and large areas of Lincolnshire, Nottinghamshire, and Derbyshire.

The new buildings, which replace the old office at Balm Walk, give excellent storage, warehousing and despatch facilities for small tools, auxiliary equipment and spares, and machine tools. There is a well-equipped showroom for the display and demonstration of machine tools. The staff includes workshop-trained engineering specialists able to advise on production, measuring, and inspection problems.

The showroom provides 14,000 sq. ft. of floor space for the storage and testing of a wide range of machine tools. The warehouse has some 4,000 sq. ft. of floor space and over 5,000 ft. of shelving. The illustrations at the foot of the page show the interior and exterior of the premises.

Parliamentary Notes

Rail and Road Fares

Lord Fraser of Lonsdale asked H.M. Government in the House of Lords on July 3 if it was aware that the fare by coach from London to Bath is 28s. 3d, return, seat guaranteed, taking 5¼ hours, whereas the fare by rail (second class) is 45s. return, no seat guaranteed, taking 2 to 2¼ hours; and whether they would call the attention of the British Transport Commission to these facts?

Lord Chesham, Joint Parliamentary Secretary, Ministry of Transport, said that the Minister of Transport would not need to call the attention of the British Transport Commission to these facts. Long-distance coach travel by road was usually cheaper than second-class travel by rail. The Commission were free within the limits of the authority given to them by Charges Schemes settled by the Transport Tribunal to fix its railway passenger fares. While the level of fares by long-distance coach had a bearing on this matter, there were other factors to be taken into consideration, including speed, frequency and availability of service.

Railway for Swaziland

Mr. John Dugdale (West Bromwich—Lab.) asked the Secretary of State for Commonwealth Relations on July 3 if he would state the conditions imposed by H.M. Government on the granting of permission for a railway to be built across Swaziland.

Mr. Bernard Braine, Parliamentary Secretary, Commonwealth Relations, said that the question whether a railway should be built across Swaziland was still under consideration.

Questions in Parliament

Accelerating Modernisation

Dr. Reginald Bennett (Gosport and Fareham—Con.) asked the Minister of Transport on June 28, if he would give a general direction to the British Transport Commission to accelerate the modernisation, under the capital development programme, of the railway signalling system, in order to meet the needs of new rolling stock and services now being provided.

Mr. Marples said in a written answer that it was for the Commission to ensure that the various parts of the modernisation programme were properly related to each other.

Staff & Labour Matters

N.U.R. annual conference

In his presidential address at the Annual Conference of the N.U.R., which commenced on July 3, Mr. W. Rathbone said:

"The financial inability of the industry to pay increased wages cannot be accepted as a reason for refusing a justifiable claim.

"The job of the railwayman is one of skill and responsibility, which carries entitlement to a decent rate for the job.

"It certainly cannot be accepted that the present minimum wages of £8 8s. per week is an adequate rate for the job.

"Great changes are taking place in our industry, and we have temporarily lost political power. But let there be no misunderstanding or faint hearts—we still have a strong union which places us in a powerful industrial position.

"Since our last annual conference the British Transport Commission has been ruthlessly destroyed and with it, if those responsible finally get their way, all hopes of a co-ordinated, integrated system which alone can overcome the transport chaos existing today.

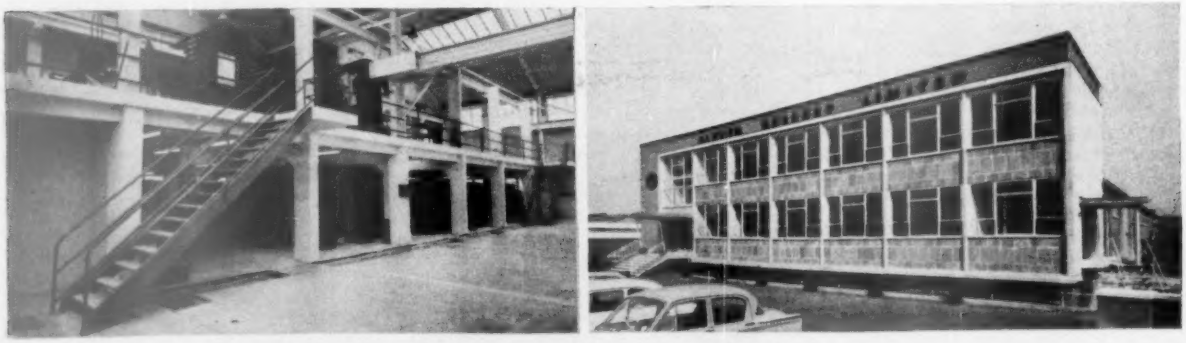
"The Commission has had a very raw deal indeed. They have received little credit for some outstanding achievements and the scantiest recognition of enormous handicaps and difficulties.

"Having got the railways into a terrible mess the Government produces a White Paper to clear it all up. But by no stretch of imagination can this White Paper be regarded as an honest plan to give the nation the efficient transport system it so obviously needs.

"The N.U.R. emphatically rejects the Government's policy of decentralisation. We stand for a fully co-ordinated and integrated transport industry."

Railway award

About 790 skilled tool-room operatives in British Railways workshops have been awarded an increase in their special allowance from 4s. a week to 10s. a week. The award is by the Industrial Court.



Interior and exterior views of Alfred Herbert's Leeds branch office

CONTRACTS AND TENDERS

1,000 wagons ordered for Pakistan Eastern Railways

Metropolitan-Cammell Carriage & Wagon Co. Ltd. has been awarded a contract for 1,000 four-wheeled steel covered goods wagons for the Pakistan Eastern Railways. These metre-gauge wagons are for service in the Eastern Bengal jute traffic.

Earlier this month Metro-Cammell completed delivery against a previous order for 1,000 of this type.

This repeat order, awarded to the firm in the face of severe international competition, is the seventh wagon order for Pakistan within the last 10 years, and, on completion, nearly 5,000 wagons will have been supplied.

British Railways, Scottish Region, has placed the following contracts:

Jas. Miller & Partners, Ltd.: erection of underbridge at Lochymuir, Charleston Branch

Communication System Limited: provision of telephone concentrators, signal post telephones, and associated equipment, Perth

John McAdam & Sons Ltd.: construction of roadways, concrete apron, drainage and water supply, etc., Aberdeen

Jas. Coombe & Sons Ltd.: provision of diesel maintenance facilities and heating in Eastfield Motive Power Depot

Communication System Limited: supply and installation of telephone equipment at Millerhill Marshalling Yard

Tilghmans Limited: provision of shot blasting machine at Townhill Wagon Repair Depot

P. & W. Anderson (Scotland) Limited: road motor service buildings and carriage & wagon shelter, at Sighthill Freight Terminal.

Jas. Scott & Co. (Electrical Engineers) Ltd.: installation of electrical services, at Sighthill Freight Terminal.

Webster Bannerman & Co. Ltd.: demolition and excavation work at east end of yard, at Sighthill Freight Terminal.

Communication System Limited: Supply and installation of signal posts, telephones and associated equipment for Cathcart Circle, Glasgow suburban electrification.

British Railways, North Eastern Region, has placed the following contracts:

R. C. Williamson: improvements to staff amenities at Shildon Wagon Works

Ex-Cell-O Limited: provision of machine tools and equipment for the Locomotive Carriage and Wagon Development Unit at Stooperdale, Darlington

Lansing Bagnall Limited: provision of a Fork Reach Truck for the General Stores at Shildon Wagon Works

Messrs. J. R. Rutherford & Sons: construction of two concrete pits and washing apron and drainage for the diesel multiple unit repair shop at Walkergate

Manchester Slate Co. Ltd.: reconstruction and repair of the roof at York Motive Power Depot.

Industry Suppliers, Limited: supply and erection of partitioning at Gateshead Traffic Stores

Messrs. Cawood Wharton & Co. Ltd.: construction of roofs over platforms 1 and 2 at Bridlington

Enfield Standard Power Cables Limited: cable work in connection with the modernisation of signalling at Gateshead New Signal Box.

Messrs. W. Spencer & Sons: conversion of an existing building for the use of supervisory staff at Hunslet East Goods Yard, Leeds

Messrs. J. W. Roberts: application of Sprayed Limpet Asbestos on 15-4 coach sets and 8-2 car sets including 8 Griddle Cars under construction at York Carriage Works for the Liverpool Street, Walton and Clacton electrified lines

William Lax: improvement to Carlbury Crossing Cottage, Piercebridge

Messrs. A. Tremble and Sons, Ltd.: reconstruction of the General Store roof at Shildon Wagon Works.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From South Africa:

20 electric motor-driven, self-contained, double stone floor grinders

17 dust extraction units for use with the above.

The issuing authority is the Stores Department, South African Railways, and tenders should be addressed to the Chairman of the Tender Board, S.A.R., P.O. Box 7784, Johannesburg. The closing date is August 11. The tender No. is G.8702. The Board of Trade reference is ESB/20987/61.

7 four-wheeled, pneumatic or cushion tyred, industrial electric tractors of not less than 5,000 lb. service weight

7 batteries for the above

1 charging plant for lead acid batteries.

The issuing authority is the Stores Department, South African Railways, and tenders should be addressed to the Chairman of the Tender Board, S.A.R., P.O. Box 7784, Johannesburg. The closing date is July 14. The tender No. is F.8575. The Board of Trade reference is ESB/20962/61.

From Thailand:

One 18-metre 100-ton traverser complete with electric motor, trolley lines, poles, and other accessories.

The issuing authority is the State Railways of Thailand, Yod-se, to which bids should be sent. The closing date is August 15. The tender No. is 04168. The Board of Trade reference is E.S.B./20459/61.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

NOTES AND NEWS

Lamp price changes. The A.I.E. Lamp & Lighting Company has adjusted the price of mercury-vapour discharge lamps, and certain vehicle lamps.

Mr. J. F. Harrison. In the editorial reference to Mr. J. F. Harrison's election as President of the Institution of Locomotive Engineers, we described him as "Chief Mechanical Engineer of the London Midland Region of British Railways." This was an error. Mr. Harrison is Chief Mechanical Engineer, British Railways Central Staff, British Transport Commission.

Three-course meals on motor coaches. The Ribble Motor Services Limited is to extend the light refreshment facilities on its "Gay Hostess" coaches to three-course meals for excursionists and private parties.

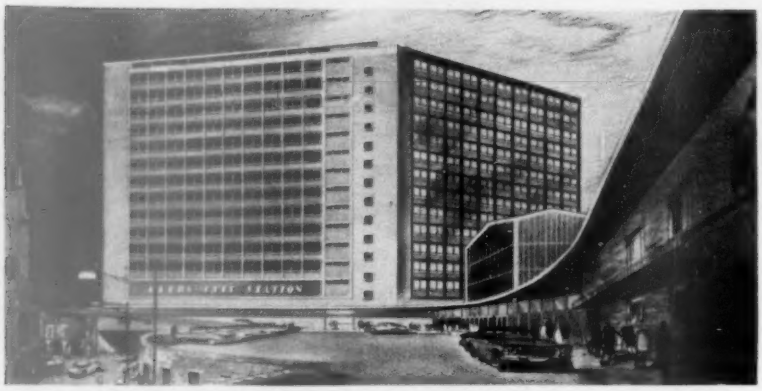
Computer for C.N.R. The Canadian National Railways is to instal a magnetic tape computer at its headquarters in Montreal. It will be the focus of a countrywide data processing network.

First aid certificates. Regional Meritorious First Aid Certificates were presented to Mr. H. Brain, Coppersmith, Motive Power Department, and Mr. J. J. Smith, Assistant Yardmaster, Operating Department, British Railways, North Eastern Region, by Mr. S. J. Judson, Chief Establishment & Staff Officer, on July 7, in recognition of treatment given to injured colleagues.

European computer association. A European Computer Manufacturers' Association has been established with headquarters in Geneva. Association members are European companies which develop, manufacture, and market, data processing machines designed to process digital data for business, engineering and scientific purposes.

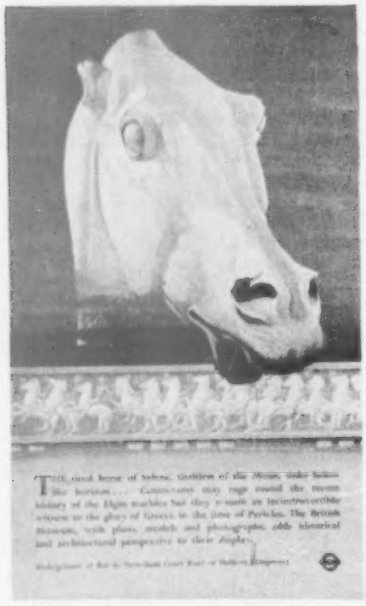
Engineering exports. Exports of electrical and allied products were 8 per cent more in the first five months of this year compared with last year. The total value was £138 million and the largest increases were made by radio and telecommunication equipment, and domestic appliances.

Electronics on British Railways. The London Midland Region of British Railways has completed a two-year re-equipment programme in its Machine Bureau at Derby. The introduction of five electronic computers and nearly 80 ancillary machines has resulted in staff economies and increased work output in many fields ranging from cost analysis to clothing orders.



Architect's drawing of office block to be built over Leeds City Station

Underground film. The London Transport Executive is to convert the exhibition site at Charing Cross Underground Station booking hall to show a film on night maintenance work on the London Tubes. The film will be shown from July 6 to 27.



London Transport poster

London Transport poster. A London Transport poster which directs travellers where to see the Elgin Marbles depicts the famous head of Selene's tired horse sinking wearily below the horizon. The sculpture was originally on the east pediment of the Parthenon. The poster is illustrated above.

Chilton freight branch closure. The North Eastern Region of British Railways is to close the Chilton freight branch line from July 31. Freight traffic will be dealt with at Ferryhill.

Fire at Newcastle. Emergency local services were operated by the North Eastern Region of British Railways after a fire had dislocated the signalling system at Newcastle-upon-Tyne Central Station on July 3. Single-line traffic through the station was restored after an hour but long-distance traffic was delayed up to 90 minutes.

Italian railway rates increased. The Italian State Railways has raised freight rates on goods in bulk by 10 per cent and on smalls traffics by 20 per cent. The increases do not apply to fruit and vegetables. Passengers fares have been raised 15 per cent.

Offices over station. Leeds City Station on the North Eastern Region of British Railways is to have an office block built over it by Myton Limited. The project is estimated to exceed £750,000. One wing will straddle the concourse and the other, supported on a steel " table," will span the main road and the permanent way. A car park for tenants will be provided in the railway arches underneath. An architect's drawing is illustrated above.

Tube train collision. Two empty Tube trains collided on the Northern line between Camden Town and Golders Green on July 3. One train was partially derailed but nobody was injured. Services were restored after half an hour, except between Hampstead and Golders Green.

Passenger questionnaire. To find out what passengers think of services in Norfolk, the Eastern Region of British Railways is leaving questionnaires on the seats of railway coaches. Comment is invited on comfort, convenience, and punctuality.

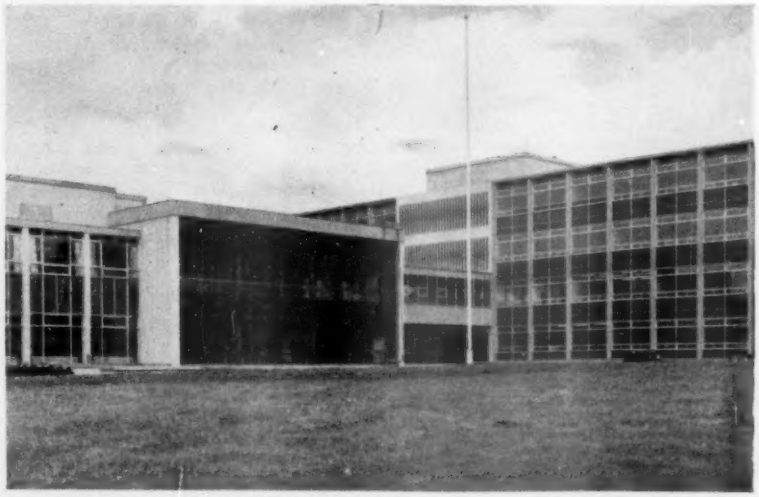
Indian railway electrification. On June 8, the Purulia-Asansol section of the South Eastern Railway, 77 km. in length, was brought into operation when Mr. H. D. Awasty, General Manager & Chief Engineer, Railway Electrification, switched on the 25 kV. a.c. supply at Ramkauali.

Belgian rail loan. Belgian and German banks have made preliminary underwriting arrangements for a dollar-deutschmark bond issue by the Belgian National Railways. Subscriptions must be in U.S. dollars but holders will have the option to collect interest or repayment in either currency at current parity. The loan will be underwritten at 97½ and will be a 15-year issue at 5½ per cent.

Guest Keen & Nettlefolds Limited. Record net profits of over £15 million were achieved by Guest Keen & Nettlefolds Limited, in 1960. The current turnover had been maintained at approximately the same rate as in the corresponding period last year in the face of increasing costs and competitive trading.

Glass research laboratories. Pilkington Brothers Limited has opened a glass-research laboratory at Lathom, near St. Helens. The premises were opened in mid-May for basic and applied research into flat and optical glass, glass fibres, insulators, and cathode-ray tubes. The illustration below shows a general view of the exterior of the building.

Czech Railways A.W.S. The Czechoslovakian State Railways is installing an automatic warning system on 350 km. of line. This work is due to be completed within the next five years. The system selected is one employing a weak a.c. current creating an electro-magnetic field at given points. The impulses so generated are picked up by a receiver which is accommodated on the locomotive.



Research centre opened by Pilkington Brothers Limited at Lathom, St. Helens

Mr. J. H. Collier-Wright (right) and Sir Patrick Renison at the Nakuru County Jubilee show

Deferred dividend. The Birmingham Carriage & Wagon Co. Ltd. is deferring the dividend on the £100,000 6 per cent cumulative preference capital due in August. There was no dividend on the £990,975 ordinary stock for 1960 when a group loss of £255,151 was incurred.

Continental rail delays. International trains to Paris and Brussels left Amsterdam more than an hour late last weekend. The crowded timetables of the Netherlands Railways have posed many difficulties since the beginning of the summer and the extra trains to the seaside put on because of the hot weather caused a number of delays.

Welding Equipment Division formed. The English Electric Co. Ltd., has formed a Welding Equipment Division at the company's Accrington Works. The Manager will be Mr. R. H. Boughton, the Chief Engineer, Mr. F. Mullery and the Sales Manager, Mr. E. H. Ayres.

Railway Benevolent Institution. At its meeting on June 26 the board of the Railway Benevolent Institution granted annuities to 4 widows and 2 members involving £144 a year, and 216 gratuities involving £2,261. Grants made from the Casualty Fund during May amounted to £692.

New tank wagon. Powell Duffryn Engineering Co. Ltd., has introduced a tank wagon with a gross laden weight of 40 tons and a payload of 25 tons. Shell-Mex & B.P. Limited is to use 28 of these vehicles for the carriage of liquid bitumen. The wagon frame is made from rolled steel joists and the axles are at 15-ft. centres.

Nakuru County Jubilee Show. Mr. J. H. Collier-Wright, Chief Commercial Superintendent, East African Railways & Harbours, accompanied the Governor of Kenya, Sir Patrick Renison, on a tour of the railway pavilion at the show. Among the exhibits they saw a model of the new ship R.M.S. "Victoria," which Lady Renison is to commission at Kisumu on July 22, 1961, and which will then go in service on Lake Victoria. In the accompanying illustration Mr. Collier-Wright and Sir Patrick Renison are shown inspecting the model.

The Retired Railway Officers' Society. The annual autumn luncheon of the Retired Railway Officers' Society will be held at the Hotel Russell, London, W.C.1, on October 31 next. The President, Mr. R. O. Griffiths, will be in the chair.

B.T.C. (Passenger) Charges Scheme, 1959. The Transport Tribunal's alterations to the British Transport Commission (Passenger) Charges Scheme, 1959, made by Order of the Tribunal dated June 14, have been published and may be obtained from Her Majesty's Stationery Office.

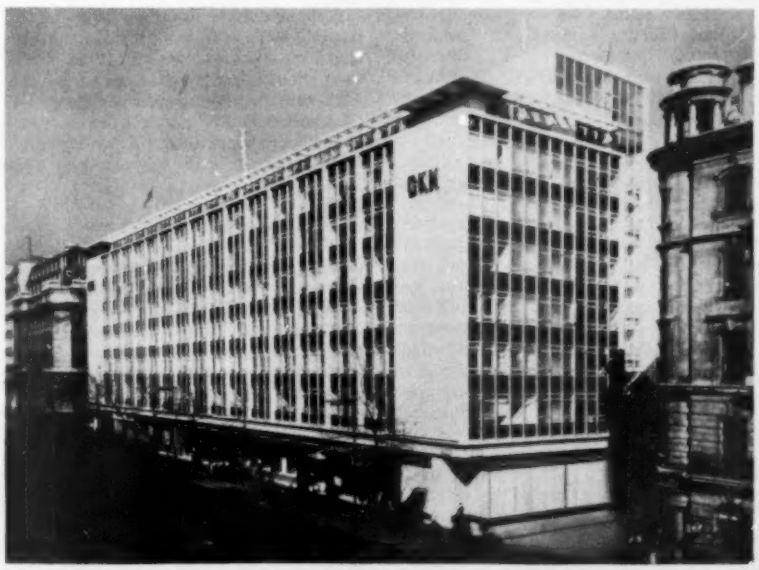
Air travel increase. The Board of Trade Statistics for 1960 reveal that nearly 14 million passengers travelled to and from the United Kingdom in 1960, nearly 1·3 million more than in 1959. Nearly the whole of this increase was due to air travel which rose by 25 per cent.

German railways to raise loan. The Capital Issues Committee has granted permission to the West German Federal Railways to raise a DM250 million loan at 5 per cent. The loan, at an issue price of 98 per cent, will be repaid within 12 years.

Bridge demolition. The London Transport Executive is to demolish the brick-arch bridge which carries the Metropolitan Line across Sandy Lodge Lane, Moor Park, on July 9. The first span of the new steel and concrete bridge which will replace it is already in use and the demolition will make way for the second span.

G.K.N. Group offices. The Guest Keen & Nettlefolds Group has recently gathered the London offices of its members under one roof in Kingsway, London. Called G.K.N. House the building is constructed on a reinforced concrete frame, the external walls comprising 31,000 sq. ft. of glass. The architects were Lewis Solomon, Kaye & Partners, the builders the Token Construction Co. Ltd., and the consulting electrical engineers McLellan & Partners. An illustration of the exterior of the building appears below.

New London to Luxembourg route. A new rail-air-rail service from London to Luxembourg was inaugurated on June 30. British and Belgian railway timetables and the times of Channel Air Bridge aircraft from Southend to Ostend have been co-ordinated to make this through journey possible three times daily during the summer. The service includes



Offices of Guest Keen and Nettlefolds Group recently opened in Kingsway, London

coach links from Rochford to Southend and from Ostend Airport, to Ostend Station. A fast train from Ostend connects in Brussels with a slower one to Luxembourg. Through bookings can be made at Liverpool Street. The journey is scheduled to take 8 hr. The ordinary return fare with second class rail is £13 3s. 6d.

Continental car sleepers. A useful pamphlet has been issued by the German Federal Railway describing car sleeper express trains on its system. It includes a timetable, scale of charges, a map of the approaches to loading points, and connections with similar trains inside and outside Germany.

The Soviet Exhibition. The Soviet Exhibition to be held at Earls Court, London, from July 7-29 will describe spheres of Soviet economy and the development of science and culture in the Soviet Union. Machine tools and equipment will be exhibited among other things.

Southdown Motor Services Limited. Speaking at the annual general meeting of Southdown Motor Services Limited, the Chairman, Mr. R. P. Beddow, said that the Budget had given no encouragement to constant efforts to keep down charges and maintain unremunerative services in rural areas, and the burden of the fuel oil tax remained unchanged.

Rail and steamer excursion. The Eastern Region of British Railways is to run an excursion from Lincolnshire to Oban on September 1, connecting with a steamer cruise to Staffa and Iona on September 2. The combined fare will be 103s. from Spalding, 100s. from Sleaford, 96s. from Lincoln, 94s. from Gainsboro, and 90s. from Doncaster. A limited number of sleeping berths will be reservable and light refreshment available.

West Riding ramblers excursion. The North Eastern Region of British Railways is to run a ramblers' excursion train from the West Riding to Kendal, Staveley and Windermere on July 9. Calling at certain intermediate stations between Leeds (City), Bradford (Forster Square) and Carnforth, this special excursion was organised in conjunction with the Ramblers' Association, and guides to conduct parties on rambles will be provided. Light refreshments will be available.

Protective coatings. A meeting was held recently in London to explain the protective methods and materials which are available from Coating Contractors Limited, of Buckingham. These coatings vary from synthetic rubber to epoxys, polyurethane, and members of these families. If necessary special materials are supplied to meet exceptional corrosive conditions. The coatings, which are applicable to many materials, are applied on site, or at Buckingham, depending upon whether the item to be treated is readily transportable.

Kilmacolm evening service. Beginning on July 3 an additional evening train will leave Glasgow, St. Enoch station, at 6.30 p.m. for Kilmacolm, calling at Paisley Canal, Houston & Crosslee, and Bridge of Weir. A new service will leave Kilmacolm at 7.20 p.m. for Glasgow and call at the same stations. These services have been introduced as an experiment Mondays to Fridays only until July 28 inclusive.

WESTERN REGION PUBLICITY

Poster by the Public Relations & Publicity Department, Western Region, British Railways

Lifting barriers at Marston. The London Midland Region of British Railways has brought into use a Continental type of automatic level crossing at Marston, near Bedford.

Railway Stock Market

Although there has been less talk of a possible increase in bank rate, British Funds again moved lower earlier in the week in front of the monthly gold reserve figures.

Costa Rica ordinary stock remained at 41½, Chilean Northern 5 per cent first debentures strengthened a point to 51xd, while Paraguay Central prior debentures were again quoted at 18¾ and Guayaquil & Quito assented bonds at 57½.

Antofagasta ordinary stock eased fractionally from 18¾ to 18, while the preference stock rallied a point to 34; the 4 per cent perpetual debentures were 40. Brazil Railway bonds were 3¾, while San Paulo 3s. units kept at 1s. 11¼d. and United of Havana second income stock kept at 6 with the consolidated stock at 20s. Mexican Central "A" bearer debentures were maintained at 59.

Compared with a week ago, Canadian Pacifics came back from $48¼ to $45¾xd. The 4 per cent preference stock fell from 58¾ to 56½ and the 4 per cent debentures lost a point at 53½. After easing, White Pass shares rallied to $11½.

International of Central America common shares were $18½ with the preferred $101.

Helped by the maintained 6 per cent dividend, Nyasaland Railways shares kept at 11s.; the 3½ per cent debentures at 32 were also the same as a week ago. Midland of Western Australia £1 units of second debentures were quoted at 11s. with business marked up to 11s. 10½d. West of India Portuguese capital stock was 116½ and Barsi Light Railway stock again 17.

Beyer Peacock 5s. shares, were at 7s. 9d. compared with 7s. 10½d. a week ago, at which there is a yield of 7½ per cent on the basis of last year's 12 per cent dividend. Charles Roberts 5s. shares eased from 7s. 3d. to 7s.

Wagon Repairs 5s. shares were a good feature with a rise to 22s. (compared with 20s. a week ago) the higher dividend having exceeded expectations. Gloucester Wagon 10s. shares, however, declined from 9s. 6d. to 8s. 6d. and Birmingham Wagon eased from 24s. 6d. to 24s. 3d. North British Locomotive at 6s. 1½d. were maintained on balance. In other directions, however, Westinghouse Brake dropped from 40s. 9d. a week ago to 39s. 3d.

G. D. Peters receded from 20s. to 19s. 4½d. with the general trend. Among machine tool shares, Alfred Herbert strengthened to 70s. 3d. In other directions, British Oxygen 5s. units rallied on balance from 20s. 4½d. to 22s., Tube Investments eased to 70s. 6d., but Leyland Motors rallied from 91s. 10½d. to 93s. 9d. Pressed Steel shares however, came back further from 23s. to 22s. and Dowty Group 10s. shares eased from 35s. 9d. to 35s. 4½d. Elsewhere, Ransome & Marles 5s. shares were 17s. 7½d. compared with 18s. 3d. a week ago and Pollard Bearing 4s. shares reacted from 38s. to 36s. 3d. Broom & Wade 5s. shares firmed up to 24s. 6d. In electricals, English Electric were 33s. 9d. compared with 34s. 9d. a week ago. G.E.C. lost 1s. at 33s. 6d. and A.E.I. 9d. at 39s. 9d.

Forthcoming Meetings

July 9 (*Sun.*). The Railway Correspondence & Travel Society, Borders scenic rail tour.

July 15 (*Sat.*). The Permanent Way Institution, East Anglia Section. Visit to remodelling of Colchester North Station.

July 16 (*Sun.*). The Stephenson Locomotive Society. Special train to Annesley, Staveley (G.C.), and Mexborough Sheds, and Doncaster Works and Sheds from Birmingham, New Street.

July 16–17 (*Sun.-Mon.*). Railway Canal & Historical Society. 200th Anniversary of opening of Bridgewater Canal.

July 20 (*Thu.*). The Model Railway Club, at Keen House, Calshot Street, N.1, at 7.45 p.m. "R. W. Urie and his Locomotives," by Mr. T. C. Britten.

July 22 (*Sat.*). Railway Canal & Historical Society, West Midlands group. Visit to Coalbrookdale area.

July 23 (*Sun.*). The Railway Enthusiasts' Club, North Lincolnshire area tour from Doncaster.

July 29 (*Sat.*). The Permanent Way Institution, London Section. Visit to Colchester Station reconstruction and Harwich Ferry terminus.

Sept. 2 (*Sat.*). Permanent Way Institution, London Section. Visit to Southampton Docks.

SWITCHES and CROSSINGS

Photograph by courtesy of the Chief Civil Engineer, Eastern Region.

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The photograph shows the material built up and timbered at our works for inspection, to the exact requirements of the Chief Civil Engineer.

We specialise in the manufacture of switches and crossings; single, double and outside slips; tandem, threethrow and simple turnouts; scissors crossovers and layouts of any description.

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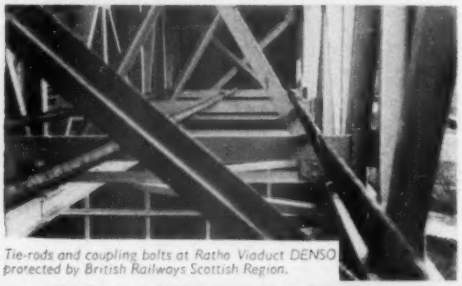
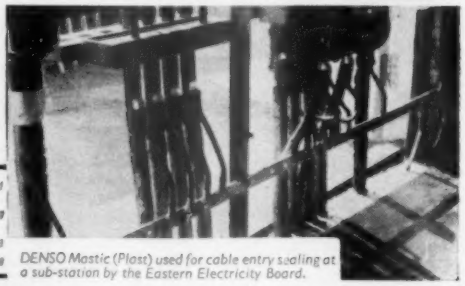


Tie-rods and coupling bolts at Ratho Viaduct DENSO protected by British Railways Scottish Region.

DENSO Tape over cork insulation at Grangemouth Ethylene plant of British Hydrocarbon Chemicals Ltd.



DENSO Mastic (Plast) used for cable entry sealing at a sub-station by the Eastern Electricity Board.

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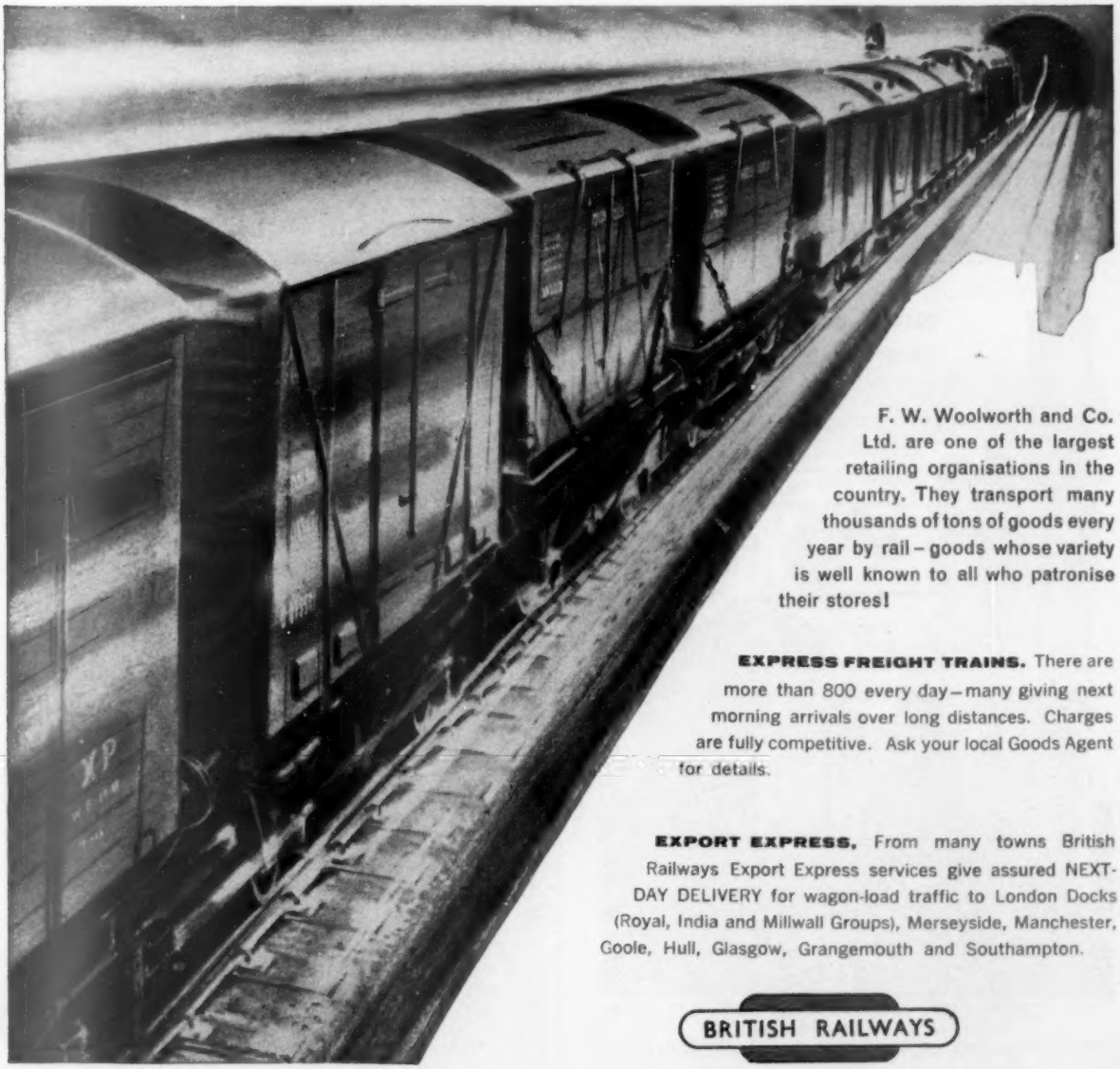

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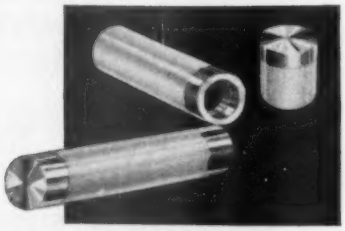

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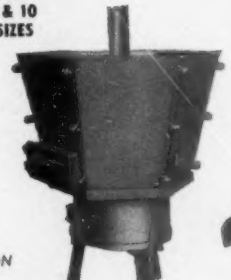

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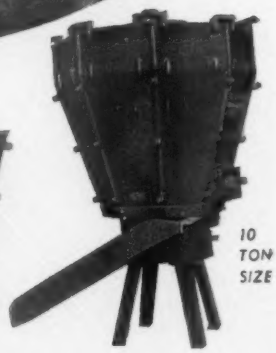

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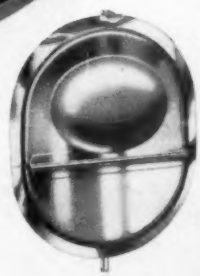

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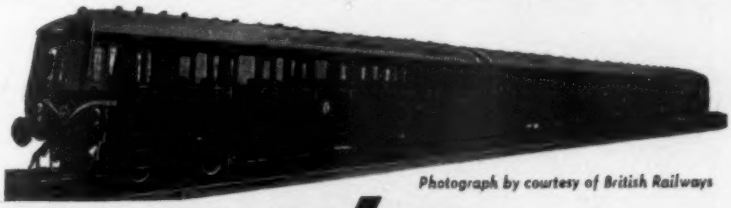

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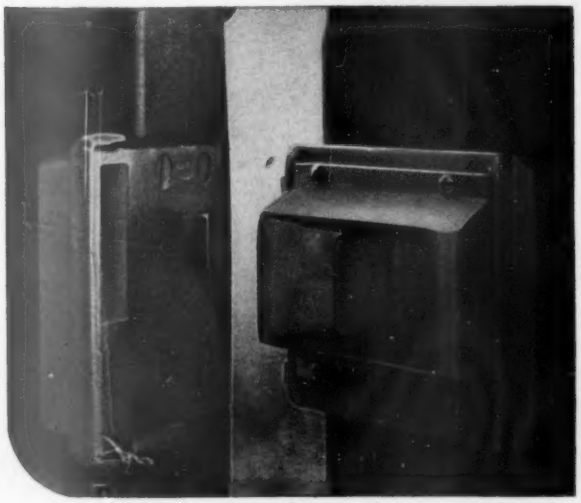

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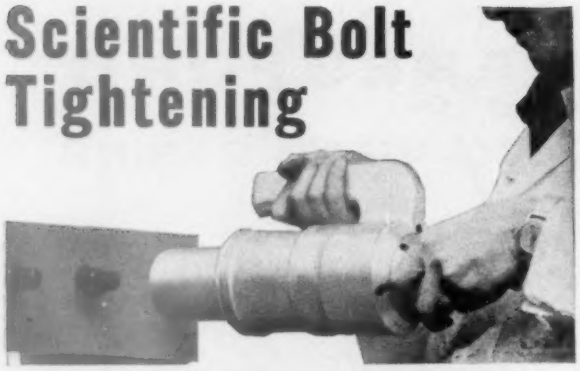

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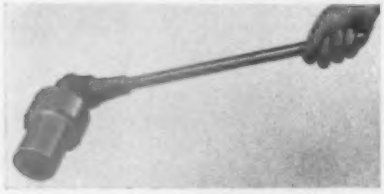

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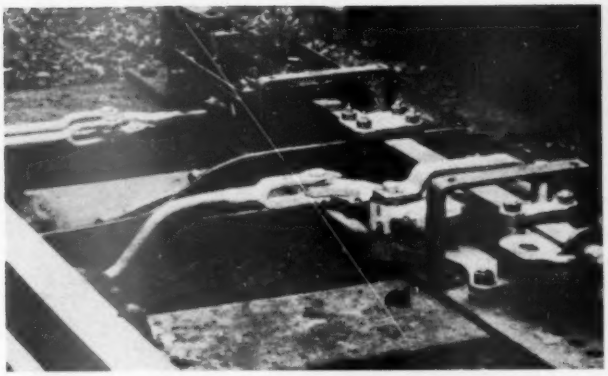

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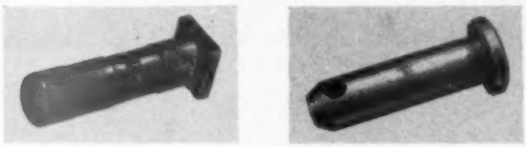

Left: Standard lubricated assembly with ½" dia. mild steel pin and hardened steel bushes, after three months operation.
Right: Anodised aluminium alloy pin ½" dia. from Glacier dry bearing assembly after three months operation. Dark area on pin is P.T.F.E. lead substance and indicates satisfactory operation.

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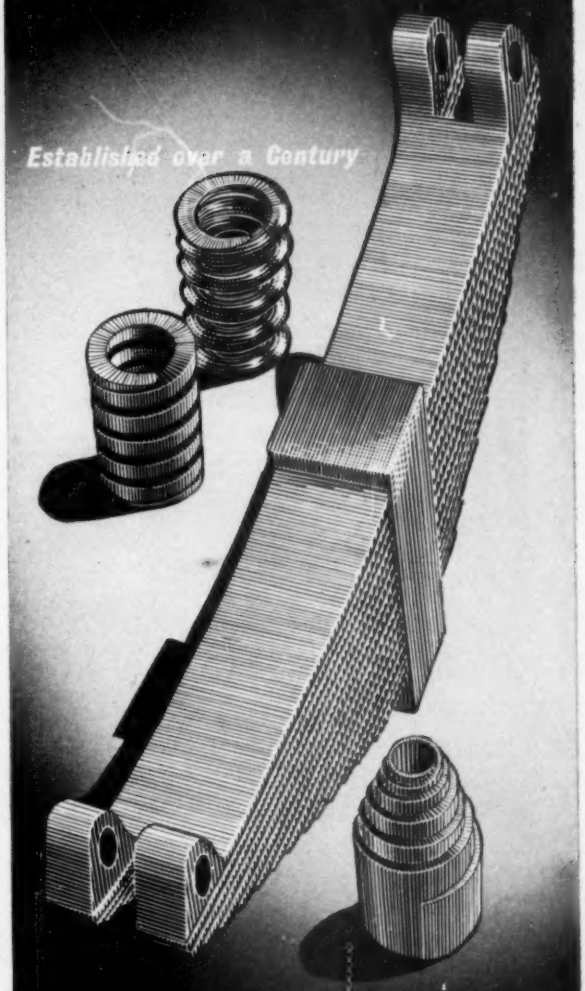

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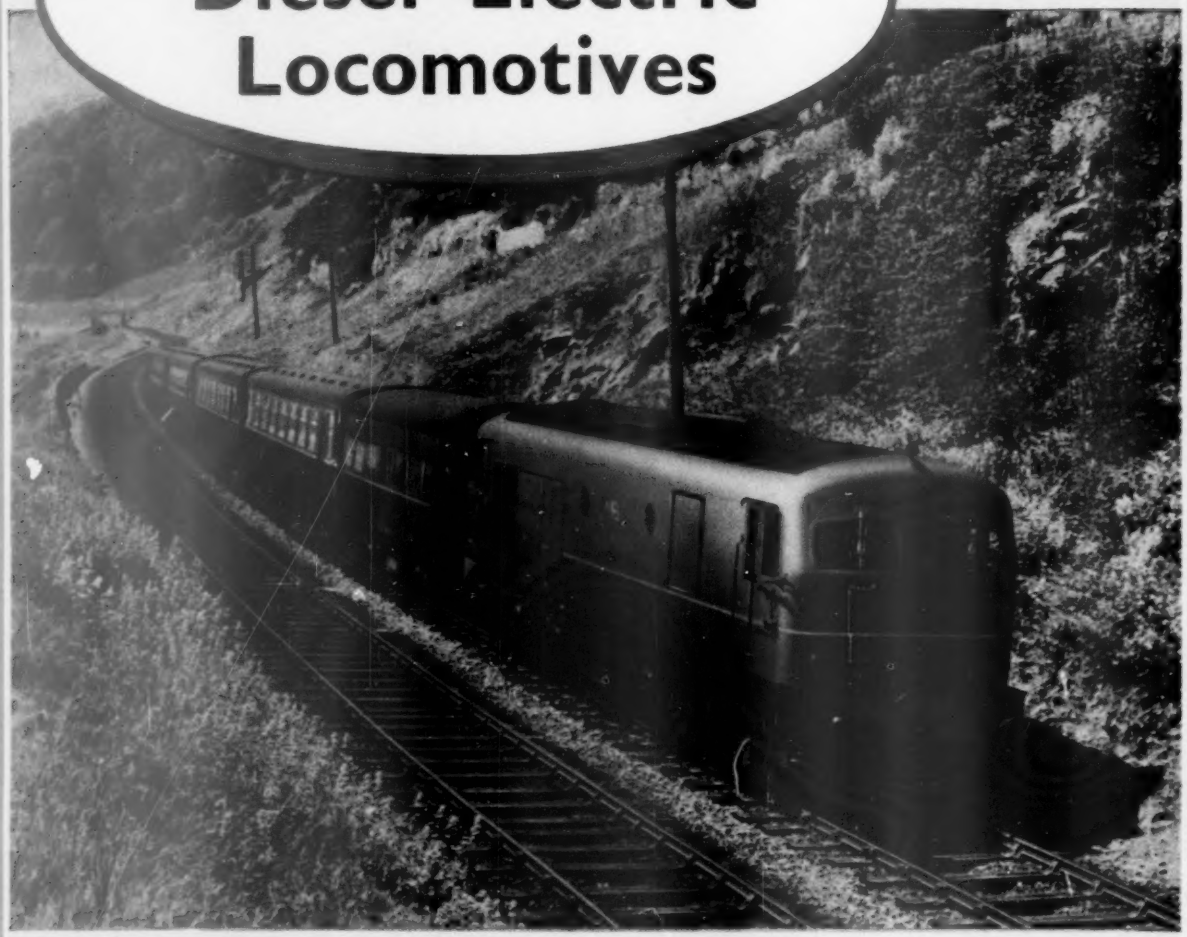

One of 94 complete diesel-electric locomotives supplied to Coras Iompair Eireann (Ireland's Transport Company), by AEI, who have supplied diesel-electric and straight electric locomotives throughout the world.

All enquiries should be addressed to the local AEI Office or direct to AEI Traction Division, Trafford Park, Manchester 17.

AEI

Associated Electrical Industries Ltd.
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MANCHESTER AND LONDON

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